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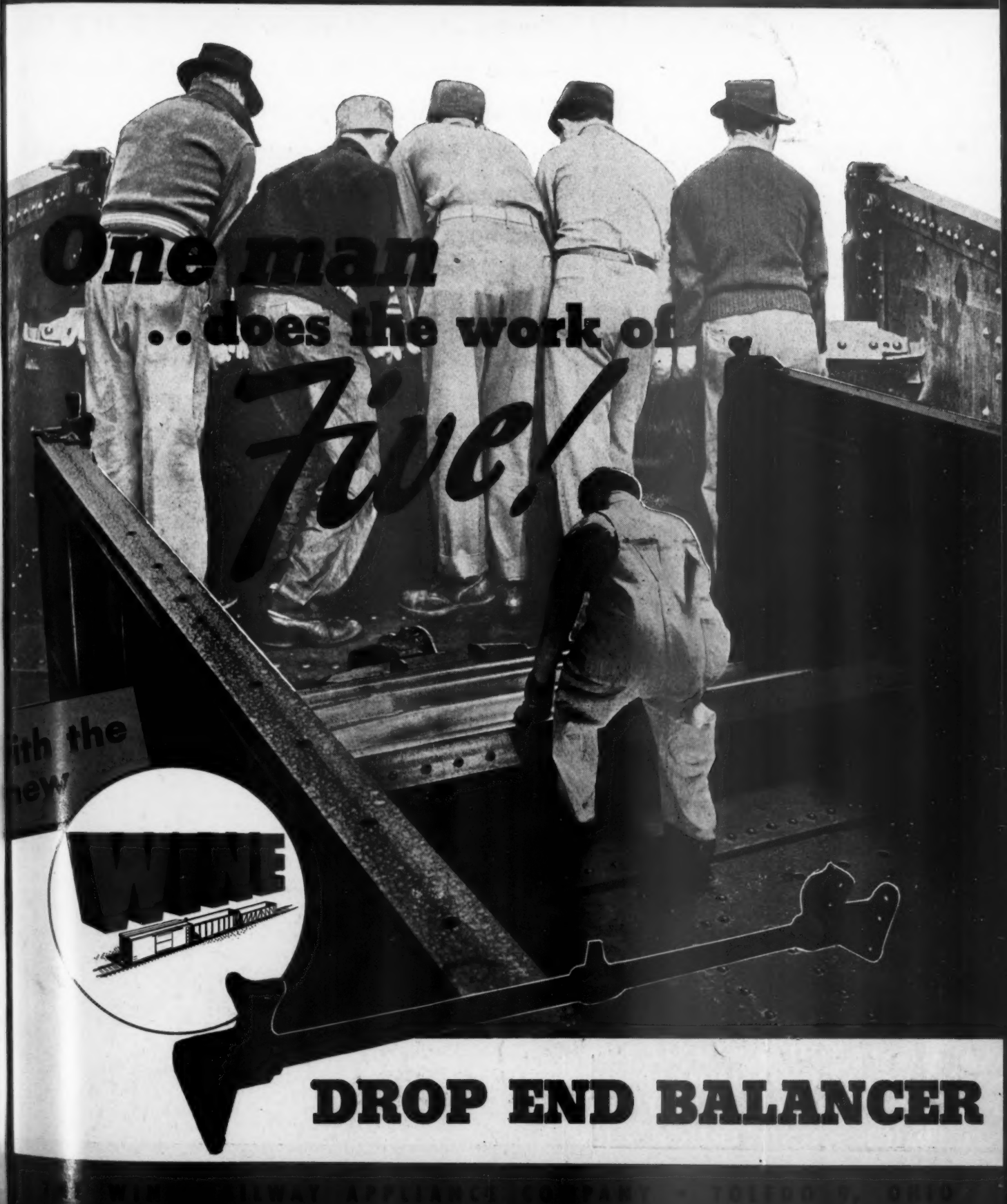
RAILWAY
MECHANICAL ENGINEER



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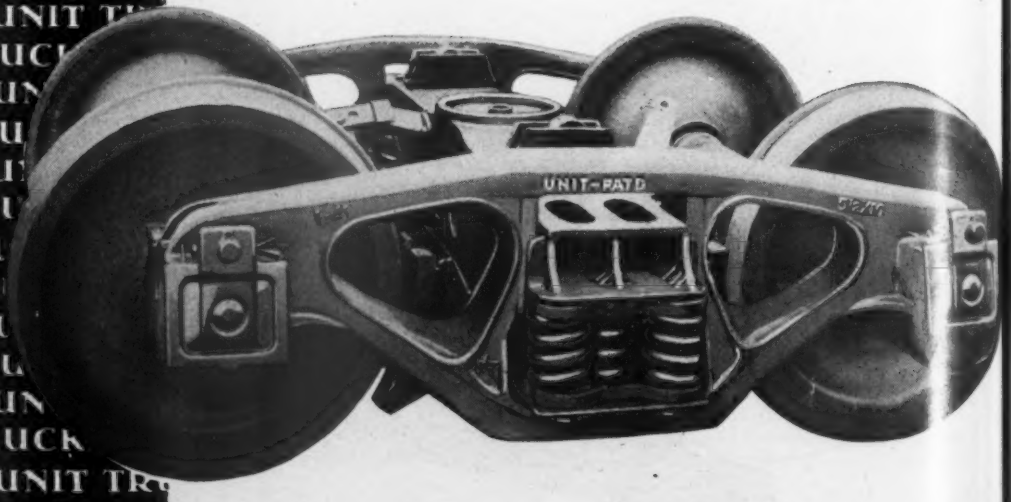

AUGUST, 1949

RAILWAY MECHANICAL ENGINEER

With which is incorporated the Railway Electrical Engineer. Founded in 1832 as the American Rail-Road Journal.

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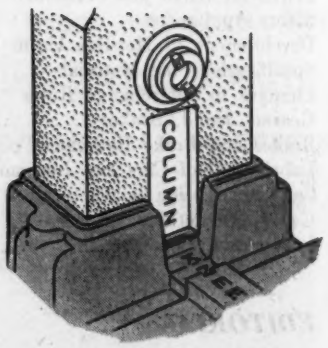

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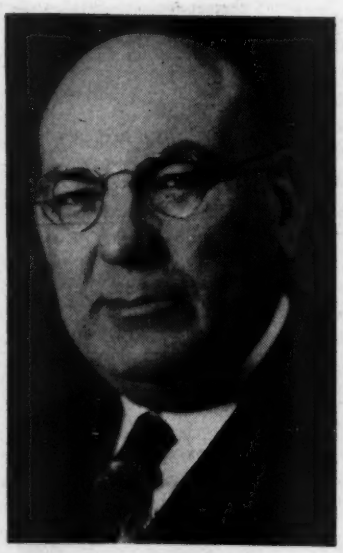

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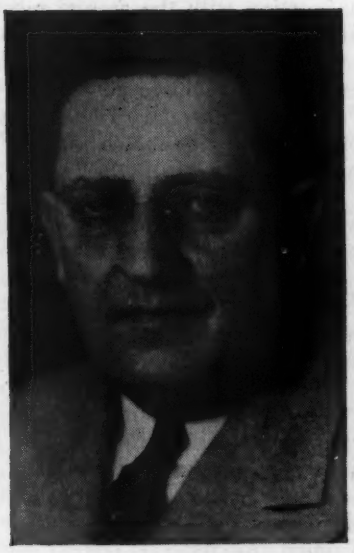

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Executive Vice-Chairman

B. M. Brown,
Vice-Chairman

Mechanical Division Considers Current Problems

In addition to the discussion of 15 technical reports members hear addresses on 40-hour week

A. C. Browning,
Secretary

J. R. Jackson
Mechanical Engineer

WHAT the 40-hour week will mean to the maintenance of equipment departments of American railroads in the matter of increased expense and manpower requirements was forcibly outlined in addresses by Gustav Metzman, president, New York Central and J. E. Goodwin, vice-president and executive assistant to the president, Chicago & North Western at the opening session of the 23rd annual meeting of the Mechanical Division, Association of American Railroads held at the Contress Hotel, Chicago, June 27 to 29, inclusive.

The total registration of railroad men was 259 and an equal number of associate members and guests of the Division was on hand at the opening session.

No exhibit of railway equipment and supplies was

held in conjunction with the annual meeting of the Mechanical Division. All sessions of the annual meeting were presided over by A. K. Galloway, general superintendent of motive power and equipment, Baltimore & Ohio, chairman of the division. Other division officers are vice-chairman, B. M. Brown, general superintendent of motive power, Southern Pacific; V. R. Hawthorne, executive vice-chairman, A. C. Browning, secretary and J. R. Jackson, mechanical engineer of the Mechanical Division.

New General Committee Members

Members of the Mechanical Division, General Committee whose terms of office expired in June, 1949, included: F. K. Mitchell, manager of equipment, New York Central; A. G. Kann, general superintendent of equipment, Illinois Central; H. B. Bowen, chief of motive power and rolling stock, Canadian Pacific; J. Gogerty, general superintendent of motive power and machinery, Union Pacific; and G. W. Bohannon, chief mechanical officer, Chicago and North Western. Messrs. Mitchell, Kann and Bohannon were re-elected to the General Committee with terms expiring in June, 1951. New members, elected to the general committee for the same term, included E. R. Battley, chief of motive power and car equipment, Canadian National, and D. S. Neuhart, general superintendent of motive power and machinery, Union Pacific, in place of J. Gogerty, retired. J. D. Loftis, chief of motive power and equipment, Atlantic Coast Line, was elected, with term expiring in June, 1950, in place of C. B. Hitch, retired chief mechanical officer, Chesapeake & Ohio.

G. W. Bohannon

J. P. Morris

C. B. Hitch

F. K. Mitchell

A.A.R.

Mechanical Division

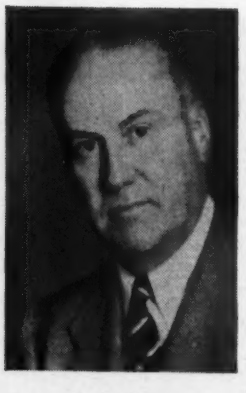
H. T. Cover

J. Gogerty

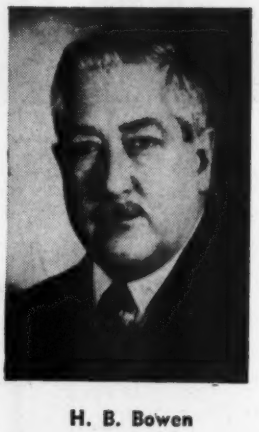
General Committee

Members

1948-49



A. G. Kann



H. B. Bowen

R. G. Henley

M. R. Brockman

Galloway Discusses Division's Progress

The mechanical departments of the Class I railroads were responsible for the expenditure of $1,558,010,454 in 1947 for maintenance of equipment and other expenses. The total operating revenue during 1947 was $8,684,918,252. This meant that the mechanical departments spent approximately 18 cents of each dollar earned.

Since the war, the railroads have acquired large amounts of new power, mostly Diesel-electric, and many thousands of new and improved freight and passenger cars. Much of this new equipment was built in shops owned and operated by the railroads. In addition, many thousands of freight cars have been rebuilt or given general heavy repairs, and the same is true of passenger-equipment cars.

Shops, facilities and tools have also been provided to replace the obsolete and worn-out equipment. During 1948 the railroads spent more money for improvements than ever before—$920 million on new locomotives and new freight and passenger cars; and in addition, $330 million for heavier rail, better signals, elimination of grades and curves, and other improvements in the fixed plant.

As a result of these extensive improvement programs since the war, American railroads have been able to carry more tons of freight at higher average speed than ever before, to improve service and reduce operating costs. The average load of freight per train in 1948 was 1,176 tons; an increase of 30 tons above the previous high record established in 1947. It was also an increase of 37 tons above 1944, the peak war year. In 1929 the average was only 804 tons.

Tons of freight moved one mile for each hour of freight train operation averaged 18,779 in 1948, compared with the previous high of 18,126 ton-miles in 1947 and 10,580 in 1929. The performance in 1948 was greater by 6.6 per cent than the wartime record of 17,623 ton-miles per hour attained in 1944.

These records were possible because of improved operating methods, larger and more efficient locomotives, better freight cars, improved signaling and other devices.

Research Program Expanded

Mechanical officers recognize that safe and economical operation of the railroads can only be maintained and improved by additional improvements in methods of doing work, in design and construction of equipment and facilities. This is especially true as our labor and material expenses have increased since January 1, 1948, and with the 40-hour week that will become effective September 1, we will have difficulty in keeping our maintenance-of-equipment expenses in the proper ratio.

To continue research on these improvement programs, a budget of $439,745 was approved for the Mechanical Division for the year 1949 at the A.A.R. annual member road meeting held in New York, November 19, 1948.

In addition, the A.A.R. is constructing a research center at the Illinois Institute of Technology, Chicago, which will house the research offices and staffs and be the nucleus around which will be built even greater research activities than those carried on heretofore.

The railroads have embarked on a large research program, both individually and collectively, through the A.A.R.

Among Mechanical Division outstanding research projects are improved freight car trucks and devices to provide easier riding freight cars, improved lubrication of cars and locomotives, improved wheels and other parts of cars and locomotives, and in fact improvements to all appurtenances and devices used in locomotive and car construction.

The manufacturers of railway equipment are cooperating wholeheartedly in the research program being carried on and are conducting extensive research to improve the product which they offer and sell.

The Committee on Lubrication of cars and locomotives will submit a proposed A.A.R. Manual of Lubrication and Lubricating Practices for Railway Equipment Cars, incorporating the various instructions and standards pertaining to this subject. It is the intent to issue this Manual in separate pamphlet form, when approved.

Following the adoption of revised Specifications for Journal Box Lids effective March 1, 1948, twenty designs submitted by six manufacturers have been formally tested and approved and certificates of approval issued.

As the result of the completion of satisfactory laboratory tests and the excellent performance of six cars in general service equipped with experimental Type F interlocking couplers for freight equipment, the Committee on Couplers and Draft Gears has authorized additional applications up to 250 car sets to cars in interchange service in order to obtain further service experience.

Following the completion of exhaustive service tests of D-22 control valves for HSC brake equipment, the Committee on Brakes and Brake Equipment is recommending that the mandatory cleaning period be advanced from 15 to 24 months.

A revision of the Air Brake Maintenance Rules, to bring them up-to-date in accordance with present day developments and operation, and including provisions applicable to locomotives other than steam, is being reviewed with representatives of the Bureau of Safety of the Interstate Commerce Commission.

After several years' road service and laboratory tests in cooperation with the Brake Beam Manufacturers Mechanical Committee, the Committee on Car Construction is recommending revision of the Standard Brake Beam Specifications and Tests to require approval tests and certification of brake beams. The recommendation provides that A.A.R. Standard No. 15 and A.A.R. No. 3 beams are to be superseded by a New No. 18 beam with requirements that beams of not less capacity than the No. 18 be made mandatory for new and rebuilt cars and for new beams applied to existing cars after a future date to be established.

The Committee on Wheels has prepared a new section for the Wheel and Axle Manual, containing instructions for maintenance, repairs and renewal of journal roller bearing assemblies, journal boxes, wheels and axles, and periodic magnetic testing of axles equipped with roller bearings.

A special joint subcommittee consisting of representatives of the Wheel, Car Construction, Locomotive Construction, Brake and Specifications Committees, the Diesel locomotive builders, car builders, air brake manufacturers, wrought steel wheel industry, truck manufacturers and manufacturers of foundation brake rigging, has been organized to consider the matter of thermal checking of wrought steel wheels in passenger service and failure of wrought steel wheels in Diesel locomotive service.

Shippers Forming Commodity Groups

There is an increasing tendency among shippers to establish groups or committees representing particular commodities, to work with the Committees on Loading Rules in determining the most satisfactory and safest methods of loading and then standardizing such loading methods. At present, six such groups of shippers are active in studies of this kind.

The matter of standardization of parts of Diesel locomotives is being continued by the Committee on Locomotive Construction and a recommendation is advanced this year for adoption as recommended practice of a considerable number of details of the component parts for interchangeable trucks for Diesel-electric switching locomotives.

Laboratory studies of roller bearing lubricants, also studies of journal box lubricating materials (oil, waste, etc.) are being progressed at the Indianapolis Lubrication Laboratory under direction of the Mechanical Research Office.

The road test program of trucks for high speed freight service and freight truck spring snubbing devices is scheduled to continue during 1949 under the same general pattern as followed during the 1948 road tests in order that the results obtained may be comparable.

The ABLC brake equipment, in tests, developed certain modifications which it is felt will improve the service performance. These changes are being worked out in cooperation with the manufacturers and, after further tests, appropriate recommendations will be made.

What Does The 40-Hour Week Mean?

By G. Metzman*

The need for progress always is great, but the necessity of instituting the 40-hour week on September 1 for all non-operating employees—totaling nearly a million people on the nation's railroads—has made the production of much greater efficiencies imperative to our very survival as an industry.

This shortened work week, resulting from the recommendations of a presidential emergency board, was inaugurated in most other industries at a time when few employees were working more than 40 hours a week. It also was introduced gradually—with a 44-hour week the first year, a 42-hour week the next year, and then a 40-hour week the following year. In sharp contrast, the railroads are required to place the 40-hour week in effect in a single step.

Including the seven cents an hour raise effective as of last October 1, the 40-hour week will represent an increase in the basic day rate of shop mechanics, for example, of approximately 25 per cent in less than a year.

Worse yet, the change to the 40-hour week, with the burden of additional employment that it imposes, must be made in a period when we already are feeling the disturbing impact of declining business. Thus we all are faced—little more than two months hence—with one of the greatest emergencies in the entire history of railroads.

First of all, we are going to have to think. We are going to have to do more constructive thinking, and in a shorter period of time, than we ever have done before. This thinking must be done—whether it requires shorter lunch hours, or longer hours at the office, or whether it is done at home.

Secondly, we are going to have to follow up this thinking with intelligent action, carried out quickly.

We must review, with a critical eye, every procedure, every operation—regardless of how long we have done it that way.

We must solicit ideas from the people in our departments as to how new efficiencies can be achieved, and keep after them for such suggestions, thus getting the benefit of their brains as well as of our own.

We must likewise resurrect and review with completely open minds any suggestions of this type which may have been rejected or side tracked in the past for a variety of reasons. The ideas which were passed up when we were preoccupied with the necessity of moving traffic at any cost must be considered anew—in the light of today's need for better efficiencies; in the light of today's higher wage levels; and in the light or today's employment markets.

It is particularly important to salvage the *old* new ideas, because the constant climb in wage levels has made machanization more and more essential, so that new machinery or new procedures which would not have been economical a decade ago—or even a few years ago—may now be vital in the interest of efficient operation.

But while we are thinking in terms of new machinery, we likewise must think seriously of how to get more output from the shop equipment we already have. Despite constant efforts, I doubt if any of us has reached the ultimate in that direction. Inasmuch as more output from present equipment involves no new expenditures, this approach promises one of the highest potential returns on the investment of time and effort.

Too Much Supervision?

We must study whether we have the proper number of supervisors. In some cases, it may be desirable to dispense with some. Probably no department ever feels that it has too many supervisors, but here is another place where we should take that fresh look that I have been talking about. There comes a point in any organization where too much supervision means that supervisors spend too much time writing memorandums to one another, making needless telephone calls to one another, and the like, with no more productive work being accomplished in the aggregate, and possibly even less.

In some other situations, it may even be desirable to add supervision to see that we are getting a full day's work for a full day's pay, and to see that the work that we are getting is productive work.

In our search for a solution to the thousand and one new problems which will confront the industry on next September 1, we shall necessarily depend to a great extent upon our supervisors. The need for good supervisors will be more important than ever, and by good supervisors, I mean leaders, not drivers; thinkers, not mental drones. We shall need men who know their jobs and know how to teach others. Men who recognize good performance when they see it and men who think and have ideas.

We should make certain that we have a sufficient number of group meetings of all our key people to plan for and make certain that on September 1 there will be teamwork in all ranks.

Don't Write—'Phone!

Every organization, unfortunately, has its proportion of people who are affiliated with "dictation disease"; who would rather dictate a memorandum than make a simple phone call, or a quick visit to someone's office in the same building. In making the best use of time a telephone call, or an office visit, often is much more efficient than a memorandum, in that it reduces the possibility of the misunderstandings which too frequently produce ruffled feelings and a series of memorandums, and because it also saves typing and filing efforts which are becoming increasingly expensive, and even luxurious.

We must cut across departmental lines more and more, in the realization that everybody is working for the *railroad*, and not for a single department. I refer to expenditures of money or mental effort by one department which will result in profitable savings in the financial accounts of an entirely different department. One example would be a mechanical department expenditure which would reduce losses to lading, and which would result in savings technically for the claim department, but actually for the benefit of the railroad as a whole. Statistics show that more than five per cent of all freight claim payments are clearly due to the defective or

* President, New York Central System

unfit condition of the car, and that a large number of other claims likewise result from mechanical failures of one type or another. It is to overlapping matters such as these—involving many millions of dollars annually on the nation's railroads—that our departments must apply broader perspective.

And now, one of the most important things of all: We must utilize every modern supervisory technique—and there are literally scores of them available—in educating our employees to the necessity of doing a good day's work, every day, and we must personally see that they actually do this. In the hearings which resulted in the presidential emergency board's findings for a 40-hour week with 48-hour pay, the unions' national representatives made much of the argument that through working fewer hours, employees would be fresher and thus would produce more work per hour. Our efforts to cope with the 40-hour week problem can succeed only if our employees respond to the obligation to do more and better work. With all the persuasiveness at our command, we must appeal to the local union representatives to back us up, thus backing up the greater productivity promises of the national leaders. Hiding behind the protective cloak of seniority, a few employees may not be impressed because their own job security may not be immediately at stake, but given the active cooperation of the employees can be impressed with the serious problem which is almost upon us. And even those employees with high seniority ratings can be made to remember that regardless of their job protection, any company which is in dire financial straits cannot possibly provide satisfactory working conditions.

Increased Mechanization Will Cut Costs

*By J. E. Goodwin**

On September first, which is quite aptly referred to as "F" Day, the greatest revolution in operating practices, wage rates and methods of serving the public will of necessity be inaugurated by the railroad industry with the establishment of the 40-hour 5-day basic work week for the so-called non-operating employees.

If the railway industry is to survive this body blow and at the same time continue the tradition of service to the public at minimum cost, all of us must exercise every bit of ingenuity we possess to get the job done at a minimum increase in cost. In most cases, traditions and past practices will have to be thrown out the window.

If we are to continue to do our work in the same manner as in the past the effect on the industry will be the same as a 20 per cent increase in wage costs. The alternative is to run the railroads without materially increasing the number of employees. There is only one practical way to approach the problem and that is through a complete analysis of every job, every piece of work and every service offered to the public. In each case we must ask ourselves whether the particular job or service is essential to the performance of an efficient and satisfactory transportation operation. If the job is essential, then we must find more economical ways and means of getting it done.

People who are not familiar with railroad operations are inclined to ask "Why should the railroads complain—other industries have the 40-hour week?"

In the first place, the railway industry is not like any other industry. You can shut down a production line Friday night and start it again Monday morning, but railroading is a 24-hour day, 7-day week operation. It is true that certain activities, such as accounting and back shop work, can be postponed or shut down for a two-day holiday, but not the actual movement of trains, the dispatching of engines from the roundhouse, or the inspecting of cars in the train yards. There has been a lot of talk about the fact that only the non-operating employees are involved and, therefore, the industry has nothing to worry about in the operation of trains. We in the railroad business know very well, however, that the car inspectors who make the train yard inspection, the mechanics, hostlers and helpers who service the locomotives at the roundhouse, the supply men who service the caboose, the yard clerks who check the train consist and line up the bills, the levermen who manipulate retarders, interlocking plants and switches, the telegraphers and train dispatchers who watch the train movements between terminals, are all just as important and as necessary as the yard crews who make up the trains, or the road crews who handle them to the next terminal.

* Vice-president and executive assistant to president, Chicago & North Western

Railway Ruling Drastic

Probably the most misunderstood part of the 40-hour week is that the public does not generally realize that no industry in any way comparable to the railroads has had to apply such a drastic agreement as that which was handed down to us and, further, that no industry, comparable or otherwise, has had a reduced work week applied with the terrific economic impact that the 40-hour week brings to our industry.

The Fair Labor Standards Act established the 40-hour week in most industries at a time of widespread unemployment and at that time few industrial workers were actually employed in excess of 40 hours a week. For example, the steel workers were actually working 33.8 hours a week. A further important difference is that the 40-hour week was established on a gradual basis—the first step was to reduce the work week to 44 hr.; a year later to 42 hr.; and the following year to 40 hr. As against this orderly and gradual approach, about one million railroad employees will be placed on a 40-hour week in one grand blow—and with no reduction in pay.

The principle of the 40-hour week was to spread employment; however, it is being applied to the railroad industry at a time of relatively high employment—in fact, a time of shortage of competent and qualified railroad employees of some classes.

In 1948, all of the approximately one million employees in the non-operating group worked at least 5½ days a week and were paid on the basis of at least 6 days a week. It is evident, therefore, that the compression of the work week from 48 to 40 hr. is not something that will take care of itself automatically—it can only be applied after serious and detailed studies by railroad officers and supervisors.

In the practical application of this award we have a choice of two methods of approach; the first is to compress the work load into five days by getting more work done in less time through increased efficiency, including mechanization, and the hiring of additional employees on a five-day basis; the second approach would be to provide relief employees for the sixth and seventh days.

Of the one million so-called non-operating employees, over 28 per cent are on seven-day positions which are necessary for the continuous operation of the railroad. It is obvious that unless you devise some radical changes in

methods of doing this work these positions will still be necessary and you will be required to more than double the present number of relief assignments. The greater number of seven-day positions which there are on a railroad, the greater will be the cost of the 40-hour work week.

It has been estimated that if we go along as we have in the past with present work methods it will require more than 200,000 additional employees and will cost the railroads close to $510 million a year—which would be the same result as though an increase of 23½ cents an hour had been granted to all non-operating employees.

Under most shop crafts agreements, the railroads have been required to pay time and one-half for Sunday work as such. It has been the general practice to restrict Sunday operations to the bare essentials and it will now be necessary to so consider Saturday or some other relief day.

However, under the 40-hour week award the crafts lost the payment of time and one-half for Sunday work as such. The mechanical departments now have an excellent opportunity, through scheduling and planning, to set up relief assignments and perform on a straight-time basis the work previously done on Sunday at penalty rates. In this way they can assist materially in reducing the impact of the cost of the 40-hour work week.

More Mechanization Needed

Mechanical department officers must seek ways and means further to mechanize operations, and no opportunity should be lost to bring about economies through such procedure in each case where studies indicate a worth-while saving can be realized by substituting modern machines for antiquated machines or hand labor methods. They must be on the alert also for better parts and better material which will extend the time between repairs to equipment. They will have to work closely with the operating department in scheduling repairs to freight and passenger train equipment. The operating officers will be up against nearly impossible odds in their efforts to maintain a high standard of service and still operate economically under the 40-hour basic work week. They will undoubtedly make every effort to reduce yard and transfer assignments, as well as freight and passenger train service, particularly on Saturdays and Sundays, all of which will affect mechanical department operations to the extent that such action will reduce the number of locomotives to be dispatched and the number of cars to be handled, inspected or repaired in yards on week ends. These items will of course have to be considered in setting up force requirements.

The application of the 40-hour basic work week at this time is particularly inopportune as it materially increases operating expenses at a time when revenues are down considerably because of the slump in general business activity. Neither carloadings nor passenger travel have come up to expectations thus far in 1949, and the tempo of industrial activity in the second half will determine, for a good many roads, whether they will have a dollar left after meeting their obligations for the year. It is indeed a sad commentary on our national transportation policy if the railroad industry which served the needs of the country so adequately and honorably in time of war is not going to be permitted to make an honest dollar in time of peace.

What Can Be Done?

Our salvation, as I see it, must come through reverting to the performance only of that class of transportation service for which we hold the inherent advantages and by that I mean the mass transportation of persons and property. Since the rate structure has about reached the saturation point, we must trim costs through elimination of the expensive frills of passenger service; we must eliminate unprofitable secondary and branch-line passenger service; we must close small country stations which do not produce enough revenue to justify the expense of operating the station; and to accomplish these things we must handle each case vigorously with the Interstate Commerce Commission or the state commission having jurisdiction.

These commissions and other public bodies concerned will have to be convinced that the railroads can no longer afford to provide costly service under the guise of public convenience or necessity when in actuality the revenues produced by such services clearly indicate an operating loss and no real necessity for the service. We can no longer afford to take 35 per cent of freight earnings, as was the case in 1948, to make up losses incurred through the operation of passenger train service. We want to offer all of the passenger service which can be justified by the patronage and the revenues which such service will produce, but it certainly is not good business to operate passenger trains perhaps 25 per cent occupied and take the resulting loss merely because we operated the same train for a number of years past.

Freight Car Supply and Damage Claims

*By J. H. Aydelott**

In a little less than three and one-half years the railroads have added 250,000 new cars to their ownership. In the same period they have retired 240,000 cars including those destroyed in wrecks or by fire. For many months the number of cars receiving repairs with a considerable proportion being upgraded has approximated 30,000 cars a month, so that since V-J Day about 50 per cent of the total ownership of railroad cars has been replaced either with new cars or with those which have been rebuilt. This is quite a remarkable performance in view of the difficulties in securing steel; also because the percentage of home cars on home lines dropped so low during 1946 and 1947 and did not improve materially until about the middle of 1948. The percentage of box cars on line during most of 1946 and 1947 was frequently as low as 17.

The physical condition of the freight car fleet at any time is seemingly dependent upon how well the Car Service Rules are observed by railroads and shippers. When the demand for cars became easier last year and it became possible to secure more loading of cars with proper regard to the location of the owner, the percentage of home cars on home lines began to improve and as of May 15 the percentage of box cars on home lines was 44.4 and of all cars 57 per cent. There was reported as of June 1, 108,532 freight cars awaiting repairs of which 43,302 were box cars. This is an increase of 23,000 cars over the number on hand in bad order on June 1, 1948. There has been a consistent increase each month in the number of cars on hand awaiting repairs largely as a result of this better observance of Car Service Rules and lighter loading requirements.

Pending a determination of what the traffic volume might require in the way of equipment when economic conditions are finally considered to be in adjustment, cars awaiting repairs will furnish quite a reservoir of equipment upon which to draw should an increased traffic volume require it. To a considerable extent these bad order cars are of modern design

* Vice-president, Operations and Maintenance Department, Association of American Railroads.

and when rebuilt will amply protect the same character of commodity loading as does the new car. With the railroads having a known capacity for turning out 30,000 heavy repair cars each month, it can be seen that the rate of delivery of newly conditioned freight cars, as compared to that of new equipment, will be practically three times as great. This, with other factors, accounts for the rapid decline, and almost disappearance, of orders for new cars during the last several months. From the cars among the 108,000 which will be torn down instead of repaired a lot of usable material will be reclaimed and a considerable tonnage of scrap will be made available to the steel companies. These figures are most enlightening in view of the criticism of the failure of the railroads to order more new cars, bringing out the suggestion that the government should purchase a huge supply in order that there might be no ill effects to the economy or security of the nation should a national emergency occur.

Poor Cars Responsible for Claims

I urge each of you to review the statistics showing freight claim payments made by the railroads during the year 1948 in the total amount of $135,000,000. The loading of commodities in cars which evidently were in unfit condition to carry the load without damage influenced claim payments to the extent of more than $3,000,000. However, more than $35,000,000 was charged to unlocated damage and there is a growing suspicion that some considerable portion of this damage was due to the run-down condition of much of the equipment used or from poor riding qualities of many of our box and refrigerator cars which qualities may be more or less inherent in the construction of the car itself.

That the number of freight claims filed in 1948 declined nearly one million from the number filed in the previous year seems conclusive evidence that the retirement of so many thousands of old and worn out freight cars contributed greatly to reduction in loss and damage expense, the traffic volume in 1948 being only slightly less than that of 1947. The 1947 volume exceeded that of any wartime year.

The railroads hope to improve the riding qualities of cars by developing better trucks and by giving closer attention to wheels and the manner in which wheels are mounted.

Whether the improvement in the trucks and wheels will be sufficient to provide a smoother movement for the loaded car whether it contains 25 tons or 50 tons remains to be seen. We have this variation in the load both with box and with refrigerator cars and the claims paid for unlocated damage are extremely heavy with commodities handled in both types of cars.

Another problem confronting the railroads, and the mechanical departments in particular, is the desire of some shippers to have a car of special design provided for their particular commodity which, if done, will, in considerable measure, destroy the value of a car for return loading, such as we have had with ordinary box cars.

It is quite likely, as industry seeks to lower the handling cost of its product both at the point of origin and at destination, that we shall have more of these requests and they shall, of course, receive the careful consideration and analysis of the railroad industry.

The railroads are well on their way toward the complete modernization of their freight car fleet as to the application of AB brakes, larger couplers and stronger floors. In view of the growing use of lift trucks and pallets by shippers it is most important that box cars, in particular, be provided with floors which will withstand the weight of these machines.

In the past year the railroads have moved consistently forward with respect to the quality of their locomotives, freight cars and passenger cars. In no previous period of the same duration have greater strides been made in this respect than have occurred since the close of World War II and it was accomplished in spite of critical material shortages and of extraordinary maintenance which has accumulated on many thousands of freight cars during the time they were away from the owners' rails. We are in an era of intensive competition and it will behoove the railroad industry to keep its rolling stock in first class condition so that there shall be a progressive improvement in the character of service rendered and that waste such as loss and damage to freight be reduced to the lowest possible figure.

Report on Wheels

This year's report dealt with 13 subjects which have been handled by the committee in the past year.

The change, approved by letter ballot, in Sec. 9 (a) of Spec. M-403 necessitated a change in Fig. 66-A and Par. 77 of the Wheel and Axle Manual referring to depth of chill in cast iron wheels.

A correction was approved in the table of standard freight car axle dimensions in the Manual as to the manner of using A, B, C and D axles with 1947 design cast iron wheels.

Permission has been granted to cast present A.A.R. standard wheels with new chillers to give tread contour of A.A.R.-X-1 wheel. Also, the committee reported that it did not recommend standardizing the hollow bore of A.A.R.-X-1 wheels until more shop experience had been accumulated.

No action was suggested on a recommendation to prohibit the remounting of second-hand single-plate bracketed cast iron wheels cast prior to 1942. The subject is continued.

A reduction in carbon content has been approved for Class A heat treated steel wheels (Spec. M-107) as an emergency measure and a joint committee from the Division and manufacturers is to study the possibilities of eliminating thermal cracking on passenger car wheels; also to investigate causes of Diesel wheel failures.

At the request of the Arbitration Committee this committee clarified the rules with respect to cast iron, one-wear and multiple-wear wrought steel wheels having holes drilled through the plate and recommended that Secs. 10 (a) of Spec. M-107 and Sec. 8 of Spec. M-103 be modified by the addition of a sentence specifying the manner in which test holes may be drilled in the wheel plate.

The committee recommended, as a letter ballot item, increasing the dimension *G* of the AX-36 and BS-36 design wheels shown in Sec. G of the Manual from 2½ in. to 2¾ in. without change in dimension *D*. This was done to provide ¼ in. additional tread metal and to make the normal inside rim diameter conform to the one-wear designs.

The committee recommended the continuance of wheel design CX-38 in the Manual in spite of a prior recommendation that it be withdrawn.

Minor editorial changes have been approved in connection with Manual sheets referring to wheel design CX-40 and AX-44. Item 8 on Sheet G-27 will be changed to incorporate these corrections.

Page B-44-C of the Manual will be changed to show sufficient dimension details of the alternate mounting and check gauge for cast iron, one-wear wrought and cast steel wheels to permit proper manufacture of the gauge.

Par. 135 and 354 (C) of the Wheel and Axle Manual will be revised to read, "The bearing points of the chuck jaws must be maintained *within a tolerance of .015 in. to a* plane, at right angles to the axis of the boring bar *and within a tolerance of .004 in. of being concentric with the boring bar.*" This is a letter ballot item.

The committee recommended the use of portable home-made magnetic testing devices, developed by some railroads, at outlying points where the volume of axle testing is not sufficient to justify installing more elaborate equipment.

The committee having specified the proportions of wheel mounting compounds indicates that it has no objection to the use of ready mixed compounds secured in the open market where the commercial product complies with the specified proportions.

The chart showing wheel mounting pressures (Fig. 115, Wheel and Axle Manual) has been re-arranged so that the shop man may read the pressures direct from the chart without calculation.

Appendix A of the report included the new section XXI of the Wheel and Axle Manual on recommended practice for the maintenance and lubrication of roller bearings. This addition to the manual consists of the following sub-divisions: (1) Description, mounting and removal of roller bearings, covering the Fafnir-Waugh twin bearing, Hyatt bearings, Timken-standard and quad bearings and S.K.F. pressed on and tapered sleeve types. Complete descriptions and drawings of these types are included. (2) General instructions relating to roller bearings as to handling and storage; (3) Periodic lubrication inspection; (4) Attention to roller bearings when cars are in service; (5) Attention to roller bearings when wheels are reconditioned without dismounting; (6) Attention to roller bearings when cars are in shop for major repairs or when wheels are dismounted; (7) Lateral adjustment, including a table showing the lateral adjustment for the principal railway types of roller bearings.

The members of the committee on Wheels are E. E. Chapman (Chairman), mechanical assistant, A. T. & S. F.; H. H. Haupt (vice-chairman) general superintendent motive power, Pennsylvania; I. N. Mosely, research and test engineer, N. & W.; M. S. Riegel, assistant engineer of tests, N. Y. C.; H. E. Wagner, superintendent car department, Alton and Southern; G. A. Harstad, metallurgist, C. M. St. P. & P.; A. M. Johnsen, engineer of tests, Pullman Company; W. R. Hedeman, engineer of tests, B. & O.; P. V. Garin, engineer of tests, S. P. and B. C. Gunnell, chief mechanical engineer, Southern.

Discussion

Chairman Galloway called for discussion by manufacturers' representatives and C. M. Stoner, Association of Manufacturers of Chilled Car Wheels, said that it was unfortunate that difficulties arose in boring the A. A. R. X-1 cored-hub wheel, adopted to obtain better metal distribution and get away from the heavy mass of metal in the hub itself. On June 1, 181,000 of these wheels had been shipped to railroads and car builders. Several shops have bored and mounted thousands of X-1's, and, while some had trouble at the start, this was overcome relatively soon. Reports of difficulties were no doubt based on experience with small groups of wheels. Research has resulted in the development of a cast wheel with radically different metallurgical properties from present wheels with a chilled tread, and some have gone over 100,000 miles in test. Thorough consideration is also being given to developing exceptionally high-strength cast iron by means of magnesium additions.

C. B. Bryant, Wrought Steel Wheel Industry, said that the reduction in maximum carbon content of Class A wheels from 0.63 per cent to 0.57 per cent to reduce thermal cracking was almost enough to make the Class A a different wheel. The change was largely necessitated by higher speeds, higher braking ratios, and by the use of four-wheel trucks which have wheel loads around 20,000 lb. compared to 15,000 lb. on the old six-wheel trucks. With less carbon there should be less thermal cracking, but there will also be less wear, life, and an economic balance will have to be reached as to the most desirable carbon content.

On one group of 60 cars in identical service, 950 pairs of wheels were changed due to thermal cracks. A group of the five worst cars averaged 34 pairs changed while the five best averaged only 6 pairs. In another group comprising 20 cars and two trains, 350 individual wheels were changed in six months. The four best cars averaged one wheel change each, while the four worst averaged 31. Part of the trouble is due to mechanical conditions, such as overchanging shoes which contact only 1½ in. of wheel tread. Where new and old equipment are mixed, the new squipment wheels get the heaviest wear due to the heavier wheel loads.

H. H. Lanning, mechanical engineer, Santa Fe, called attention to Fig. 149 on page 14 of the printed report relating to a collar shrunk on the axle end in a Timken roller bearing application and said the figure should be either corrected or omitted. M. S. Downes, Timken Roller Bearing Company, said this design is no longer supplied. He urged increased attention to prescribed roller bearing inspection and maintenance practices.

Vice-chairman Brown said that rolled steel wheel failures in recent months have been serious on the Southern Pacific as well as other roads, and the wheel manufacturers have a big job to do in producing better wheels which will have desired wearing properties and yet not be subject to thermal checking.

(*The report was accepted and recommendations submitted to letter ballot.*)

Couplers and Draft Gears

In the report of this committee were 13 items on couplers, of which seven called for letter-ballot action, and five items on draft gears, none of which requires letter-ballot action.

Specifications

Two changes in coupler specifications are proposed. One is to prohibit the lubrication of couplers because undesired coupler separation in service may result. The other proposes a distinction between the maximum sulphur content of basic steel and acid steel in the specifications for Type E and Type H couplers. Present limit is .05 per cent in both cases. The proposal raises the limit for acid steel to .06 per cent. Both are letter-ballot items.

Type E Couplers

Two design changes in Type E couplers are proposed for letter-ballot action. One involves slight changes in certain internal contours of the coupler head to provide efficient knuckle throw when worn. The other involves slight changes in the lock-lift lever to improve functioning of rotary lock-lift assemblies.

Type E Operating Mechanism

Two revisions are to be made in the Manual pertaining to Type E coupler operating mechanism. (1) A note is to be added calling attention to the fact that the double style of articulated rotary lock-lift assembly can be used only with the A.A.R. standard one-piece operating mechanism, but not with the Type No. 6 operating mechanism. (2) Plate C-34D in the Manual does not carry sufficient information to enable the car builders and the man in the field properly to form and assemble the rotary bottom operated uncoupling rod and bracket. To clarify this Plate C-34D is being reissued with an editorial change specifying the required shape of the rod and location of the bracket.

Type F Freight Coupler

The Type F interlocking coupler and attachments have been applied experimentally to three Pennsylvania box cars and three New York Central hopper cars in general service. Operating reports and inspections have shown very satisfactory performance. Complete laboratory tests have been made. The committee has authorized additional applications up to 250 car sets in order to obtain further service expe-

rience. The standard coupler manufacturers are now preparing a circular describing and illustrating the Type F coupler which will be distributed in the near future.

Gauge Wear Limits

A wear limit of 0.30 in. for worn coupler limit gauges and second-hand coupler gauges for Types D and E couplers have been agreed upon and are proposed for letter ballot. Establishment of wear limits for the various D, E, and tight-lock coupler maintenance and reclamation gauges is under study by this committee and the mechanical committee of the standard coupler manufacturers.

Type H Coupler Details

Changes in parts—knuckle thrower, lock-lift toggle, lock-lift levers, single and double, nuckle tail, lock, and a minor change in the coupler head—to improve lock set, lock dislodgment and knuckle throw have been approved by the committee and the revised parts are now being furnished. These modified parts may be applied to existing couplers.

The specifications for flexible carriers for use with standard Type H tight-lock couplers provide for a movement of 3 in. above and below the horizontal position. The committee recommends that this be adhered to. The need for it was questioned by a car builder.

Defective Follower Blocks

An improved design of Farlow front follower block to be made of Grade B cast steel is proposed for letter-ballot action to replace the present design cast in malleable iron, of which many defective specimens are being found on freight-car repair tracks.

Draft-Key Material

Letter-ballot action is proposed to adopt the tolerances established by the American Iron & Steel Institute for the material from which draft keys are made to replace those now shown in the Manual. The tolerances recommended are: Width of key (6 in.), —1/16 in. +3/32 in.; thickness of key (1½ in.), ±1/32 in.

Check Tests of Certified Draft Gears

The first laboratory check tests of certified gears was made in 1941 when specimens of each type of gear were removed after having been in service for five years. The results of these tests were published in Circular D.V. 1048. It was intended to select additional specimens of the same types in 1946 after they had been in service for 10 years. At the same time it was also planned to remove and test specimens of the more recently approved gears after they had been in service for five years, for comparison with the 1941 test of five-year specimens of the older gears. Since it was found, however, that it would be necessary to wait until this year before the later approved gears would have accumulated five years of service, the test of 10-year specimens was also postponed so that all of these check tests could be made at the same time, in the interest of testing economy. The result is that the tests were started early this year and the 10-year specimens have become 12-year specimens. These tests were not completed in time to include the findings here.

Waugh Twin-Cushion WM Draft Gear

Several special check tests of this type of draft gear have been made in addition to those ordinarily required, because it differed so from the conventional friction gear.

The four gears applied in 1940-41 to Armour stock Cars ASEX 244 and 205 were again removed for laboratory test during the past year. It was found that no substantial change in capacity or general performance of this gear under test had occurred during approximately eight years of service. The specimens were replaced on the same cars and again released for service.

Another road test of this gear was started by applying two car sets to comparatively old brine-tank refrigerator cars after initial measurements were taken. These will be brought back at intervals and checked for effects of service.

The test of the single gear of this type which has been held under constant compression in the laboratory and given a capacity test each month since 1942 was discontinued in March, 1949. Only slight changes were found in the performance of this gear during the test period.

A fourth test of type WM 4-6 gear was started last year when one specimen was given the usual laboratory capacity test and then placed under constant compression in the open air, protected from the weather to about the same extent that a gear on a stored car would normally receive protection. This gear will not be disturbed for two years, after which it will be again tested and inspected.

Canadian-Built Certified Gears

After check tests made in 1944-45 had revealed some conditions which needed correction on certified draft gears of Canadian manufacture, the committee has arranged to take samples of the present product of each Canadian manufacturer, selected at random from car builders' or railroad stocks. These will be sent to the A.A.R. laboratory at Purdue University to test for specification requirements. The results will be reported in detail to the Canadian member roads and a general statement of results included in the next annual report of the committee.

The members of the committee are H. W. Faus (chairman), engineer locomotive equipment, N.Y.C.; C. K. Steins, (vice chairman), mechanical engineer, Penn.; F. T. James, general superintendent motive power and equipment, D.L.&W.; N. T. Olsen, chief mechanical engineer, C.&N.W.; M. R. Buck, engineer car construction, A.T.&S.F.; B. Faughnan, assistant works manager, Angus shops, C.P.; J. W. Hawthorne, assistant chief of motive power and equipment, A.C.L.; I. N. Moseley, research and test engineer, N.&W.; A. W. Maydahl, engineer car maintenance, U.P.; A. B. Lawson mechanical engineer, B.&O.; L. R. Shuster, engineer car construction, S. P.

Discussion

F. R. Denney, assistant mechanical superintendent, Texas & Pacific, said that changes by the committee are needed, also that the Type E coupler is giving general satisfaction and definitely does not need to be lubricated. With regard to the tightlock coupler, he stated that the T. & P. had to send a carman along with some new lightweight passenger cars to help uncouple the cars when desired. This difficulty largely disappeared after wear developed.

W. J. Gabel, Jr., mechanical engineer, Elgin, Joliet & Eastern, asked if the committee had any information or recommendations regarding the use of rust preventatives on coupler knuckles, bottom rods, etc., and the answer was that lubrication is taboo, but no action has been taken regarding rust preventatives.

W. A. Emerson, superintendent car department, E. J. & E.: With regard to lubrication, manufacturers discontinued lubrication of Couplers sometime ago and now use what is known as "Nox Rust", which reduces the coefficient of friction and soon dries up and drops off after the Couplers get into service. Oil or grease accumulate dirt and abrasive, which prevents the parts from functioning as intended, with resultant separations.

The knuckle-throwing feature of the Type-E coupler seems to work as was intended when the couplers are new, but, after service, rust and foreign matter make the parts function rather hard, with the result that throwing the knuckle by the use of the uncoupling rod is rather difficult, making it necessary for the switchman to operate the knuckle by hand to full opening. The improvement suggested in this article undoubtedly will help to improve the throwing of the knuckle and operating of its companion parts.

The improvement suggested in the rotary lock lift assembly will clear up some of the troubles found in service which prevent the lock lift assemblies from dropping to normal position. Providing more clearance and improving the guiding of the lock lift lever into the lock hole assures this member of traveling up and down as was intended. The deeper countersink for the rivet heads will prevent these heads from protruding after wear occurs, when they catch on the sides of the lock-hole guide of the coupler, preventing the lift assembly from going upward when the uncoupling rod mechanism is operated.

Rotary bottom-operated uncoupling rods need constant inspection, attention and maintenance, for the reason that they get bent and distorted in service and do not help the operation of the coupler parts; in fact, uncoupling rods that are in poor condition, or twisted away from drawing sizes, work to a disadvantage, insofar as the anti-creep mechanism of the coupler is concerned. Uncoupling rods should be free of friction and should connect with the rotary lock lift lever with sufficient clearance so that when train shocks forward and back occur, the handle portion will not swing sufficiently to raise the lift assembly out of anti-creep. The bracket holding the handle end should be long enough, and extend out far enough, so that when the coupler swings laterally right or left, the handle or other projections on this rod will not get locked behind or in front of this bracket. The preferable rod seems to be the one having a horizontal portion at the handle end where it passes through the bracket, and a horizontal portion on the hook end where it connects with the lift assembly. This set-up, using horizontal portions in the rod, prevents gravity from forcing the rod in either direction and thereby tipping the lift assembly off the vertical, which adds friction to the assembly in its up and down movement, so that sometimes it may not drop to full anti-creep position.

Maintenance and reclamation gauges in railroad shops and reclamation plants are subject to hard usage and sometimes abuse. They wear and also get distorted, with the result that finished work checked with these gauges may not be correct. We feel that gauges doing work as important as this should be periodically checked against master gauges of some kind.

Front follower blocks have heretofore been made of malleable iron, and while many may be found defective, this is due to the fact that malleable iron, which can be somewhat compared to putty, takes a great many of the shocks which should be handed on to the draft gear. Malleable iron follower blocks undoubtedly protect the draft gear to a certain extent; however, due to the type of design in malleable follower blocks about 8 years ago, we found that the impact from coupler butt forced a hole through the block and we changed to a new designed cast steel follower at that time which has proven satisfactory.

With respect to draft key tolerances, these should be held within reasonable manufacturing tolerances, due to the fact that sometimes keys are hard to drive into place, due to the accumulation of tolerance beyond established limits that sum themselves up when couplers, yokes and carrier irons are put in place.

(*The report was accepted.*)

Joint Report—Railway Sanitation

The various studies, investigations and tests conducted by the Sanitation Research Project have been continued and the information developed compiled for inclusion in a final report in which it is proposed to include complete descriptions with supporting data, covering the various methods developed and tested for preventing or controlling the discharge of toilet hopper wastes onto the right of way. This will permit the selection of an arrangement which will meet individual mechanical, operating and service conditions.

The report will also include such drawings or sketches as may be necessary to illustrate typical suggested installations or adaptations to passenger cars. Estimated costs will be shown where practicable.

It is not possible to say definitely when these studies will be completed but every effort is being made to complete the final report with recommendations during the early part of 1950.

(The report was presented by chairman E. P. Moses, engineer car equipment, New York Central System, the Joint Committee on Railway Sanitation comprising three representatives each of the A.A.R. Mechanical Division, Engineering Division, Medical and Surgical Section, the U. S. Public Health Service and one representative of the Canadian Department of National Health and Welfare.)

(*The report was accepted.*)

Committee on Tank Cars

During the past year this committee was called upon to give consideration to a total of 465 docket and applications for approval of designs. There were 269 covering designs, materials and construction of 9,909 new shipping containers, for mounting on new cars or for replacement on existing cars.

Three applications covered the construction of 35 multiple-unit cars to be used for the transportation of Class I.C.C.-106A500 type one-tone containers each. There were 168 applications covering alterations in, additions to, or conversions and reconditioning of 2,510 existing tank cars or shipping containers. Twenty-five applications request approval of tank-car appurtenance designs or materials, without reference to specific cars.

I.C.C. Specifications Amended

To clarify the intent, the Interstate Commerce Commission, by order dated July 22, 1948, amended Paragraph 13 (a) of its tank-car tank specifications 106A100 to read, as follows: "13. Retests, alterations, and upkeep of tanks, safety valves, and vents.—(a) Each tank must be subjected, at least once every five years, to the tests as prescribed in paragraphs I.C.C. 11 (a), (b), (c), and (d). A tank must be condemned when it leaks or when the permanent expansion exceeds 10 per cent of the total expansion. Report giving data showing the results of these tests must be rendered by party making tests to the owner of tank and to the Bureau of Explosives, and each tank passing the test must be marked with the date (month and year) plainly and permanently stamped into the metal of one head or chime. For example, 1-38 for January, 1938. Dates of previous tests must not be obliterated."

To provide authority for the exclusion of safety valves or vents on ton containers used for the transportation of materials that should not be shipped in containers equipped with devices of this kind, the I.C.C., by order dated March 7, 1949, amended its tank car tank specification 106A500 at Par. 9 by addition of Subparagraph (d) reading as follows: "(d) Tanks must not be equipped with safety valve or vents if prohibited for the service in which tanks are used."

The committee members are R. D. Bryan (chairman), mechanical assistant, A., T. & S. F.; L. R. Schuster (vice-chairman), engineer car construction, Sou. Pac.; H. S. Marsh, superintendent car department, Mo. Pac.; E. R. Hauer, chief mechanical engineer, C. & O.; A. A. Ott, chief car inspector, Penn.; A. F. Leppla, mechanical engineer, C. R. I. & P.; J. J. Root, Jr., vice-president, Union Tank Car Company; R. T. Baldwin, secretary, the Chlorine Institute; H J. Gronemeyer, manager, car maintenance division, E. I. du Pont de Nemours

& Co.; R. W. Thomas, manager, research and development, Phillips Petroleum Co.; and T. G. Rabbitt, superintendent, tank cars, Sun Oil Co.

(*The report was accepted.*)

Revision of Loading Rules

This year's report on loading rules was divided into two sections. Section A covered completed items which have been placed in line for inclusion in the Supplement scheduled to be issued about July 1, 1949. Section B covers items still under consideration.

Section B Items

The following 15 subjects are still under consideration, some of which require only revisions in the present specifications and figures, while others require the formulation of new specifications and figures:

1 on Forest Products . . .
Poles

7 on Steel Products . . .
Structural steel shapes and rods; bars; sheets; plates; pipe; tanks; slabs and billets.

1 on Machinery . . .
Revision of Machinery Supplement.

1 on Farm Machinery . . .
Gas-type engines; threshers; combines; hay balers; etc.

3 on Marble and Clay Products . . .
Marble; pouring channels; clay sewer pipe.

1 on Automotive Products . . .
Trailers.

1 on Grading and Road Making Machines . . .
Bulldozers; scrapers; rollers; tractor-graders; etc.

The preparation of specifications and drawings to cover the loading of farm machinery, such as threshers, combines, hay balers, gas-type engines, etc., and those to cover the loading of grading and road-making equipment, is progressing satisfactorily, and will be issued as a separate pamphlet upon completion.

The revision of the Machinery Supplement is being held in abeyance pending joint conference with the Operating-Transportation Division to co-ordinate details pertaining both to open and closed car loading, and will be issued in the near future. The other open subjects are being progressed by the various subcommittees, and will be included in the published rules upon completion.

The members of the Committee on Loading Rules are: W. B. Moir (chairman), chief car inspector, Penn.; C. J. Nelson (vice-chairman), superintendent interchange, Chicago Car Interchange Bureau; T. W. Carr, superintendent rolling stock, P. & L. E.; A. H. Keys, superintendent car department, B. & O.; G. D. Minter, district car inspector, N. & W.; H. S. Keppelman, superintendent car department, Reading; G. R. Anderson, superintendent car department, C. & N. W.; H. H. Golden, supervisor A. A. R. Interchange and Accounting, L. & N.; H. J. Oliver, assistant superintendent motive power, D. T. & I.; F. A. Shoulty, assistant superintendent car department, C., M., St. P. & P.; F. Fahland, mechanical engineer, U. P.; L. E. Day, district master car repairer. S. P., and L. T. Donovan, supervisor of A. A. R. Loading, A. A. R.

Discussion

Chairman Moir stated that the committee has met with shippers of iron and steel products, farm equipment, lumber, road grading equipment and machine tools. Satisfactory results are being secured by sitting across the table and dealing directly on mutual problems.

Since new military equipment has been developed and is beginning to move in quantity again, the rules in Supplement No. 2 will have to be revised and reissued. Revised lumber loading rules, securing the top lift, have produced good results and shippers are apparently satisfied. There are still too many failures, however, due to loads shifting and falling off open-top cars, so carriers are urged to provide more critical inspection at originating points, as well as en route, and, wherever possible, appoint a competent man on each road to follow up loading procedures, serve as a contact man between the railroad and shippers and secure closer adherence to approved loading rules and practices.

With regard to the proposed deletion of Rule 101 covering the loading of 42-in. wheels in carload lots from manufacturers for shipment abroad during the last war, a member asked if this rule cannot be used for the loading of Diesel locomotive wheels which now have to be handled in considerable quantities. Chairman Moir replied that most railroads have their own special cars for this purpose, but the committee will investigate the matter further.

(*The report was accepted.*)

Prices for Labor and Materials

To provide an equitable basis for inter-road billing, the committee continued the work of analyzing material, labor and new equipment costs in freight rules 98, 101, 107, 111 and 112, and in passenger rules 21 and 22 to determine and recommend changes to be made in the next supplement of the current code.

All miscellaneous material prices in Rule 101 were rechecked as of March 1, 1949. The note following Item 107-C is modified to include parts for geared hand brakes and is relocated to follow Item 107-G. All combination labor and material allowances were modified in Supplement No. 1 to the 1949 Code, effective May 1, 1949, to conform with revised A.A.R. labor rates brought about by an increase in hourly wage rates.

A new Item 19-A is added to Rule 107 to provide a charge for the application of a brake-hanger-bracket bushing, wear plate, or securement detail, for loop-type brake hangers. Upon announcement of the 7 cents increase in hourly wage rates, Item 92 covering freight-car labor was increased to $2.35 per hour and key items in this rule reviewed and modified accordingly.

All combination labor and material allowances in Rule 111 were also modified in Supplement No. 1 to the 1949 Code, effective May 1, 1949, to conform with revised A.A.R. labor rates brought about by the 7 cents increase.

Item 15—Cleaning, lubricating and repairing AB freight brake equipment—is increased from $16.08 to $20.43. Item 15A—Cleaning, lubricating and repairing AB-1-B freight brake equipment, including all operations in Item 15, plus those required on additional portions of this brake—is increased from $25.21 to $31.29.

Recommendations in Rule 112 were made respecting reproduction pound prices of new freight cars of all classes, in order that Supplement of August 1, 1949, may reflect 1948 costs in lieu of figures shown in the present Code. New prices recommended are based on the cost of 72,501 freight cars constructed during the year 1948. Prices covering special allowances in Paragraph 9 (c) are modified to conform with present costs for such installations.

Passenger Car Rules

Items 19, 19-A and 20 in Rule 21 covering passenger-car labor were modified. All combination labor and material allowances were later reviewed and modified in Supplement No. 1 to the 1949 Code, effective May 1, 1949.

In Passenger Car Rule 22, the table of passenger-car axles

is modified to include axles designed for roller bearings, a new Note 1 added and the present note modified and relocated as new Note 2. Passenger-car axles designed for roller bearings, and those designed for friction bearings are combined in one table. All combination labor and material allowances are modified in Supplement No. 1 to the 1949 Code, effective May 1, 1949.

A number of Items in Rule 111 and P.C. Rule 21 covering various operations on different types of air brakes were assigned to a special subcommittee for field studies to determine if the allowances therefor are in line with present costs. Included in this group are Items 15 and 15-A of Rule 111.

The committee intends again to review the A.A.R. labor rates and the combination items in the Price Rules which include labor, early in July, for the purpose of making adjustments which will be necessary on September 1, 1949, because of the 40-hour work week. To meet this situation, the secretary will prepare Supplement No. 2 to the 1949 Code of Interchange Rules early in July, for distribution prior to August 1.

For the advance information of all concerned, the revised A.A.R. labor rate for work on freight cars, effective September 1, will be $2.80 per hour. The A.A.R. freight-car hourly labor rate as of September 1, 1949, will be increased 45 cents per hour, or 19.15 per cent. Other labor rates are established by using the same percentage increase as obtains in the freight-car hourly labor rate, using the nearest multiple of five to actual result so obtained.

Revised labor rates to become effective on September 1, 1949, will be $2.80 for Items 92 and 194 of Rule 107, and $3.20 for Item 195. For Passenger Car Rule 21, the revised rates will be $2.25 for items 19 and 19-A, and $3.10 for Item 20.

The committee intends to investigate labor and material costs again in October and if sufficient change develops, necessary revisions will be made and inserted in the Rules, effective January 1, 1950.

The committee recommended material price modifications in Section (i-1) of Rule 98, in numerous items in Rule 101, in Item 19-A of Rule 107, in certain per-pound reproduction costs of Rule 112 and in special allowances Paragrph 9 (c), Section B of Rule 112. The committee also recommended a number of material-price modifications in Passenger Car Rule 22, also that the table of passenger-car axles be modified to include those designed for roller bearings, that a new Note 1 be added, and that the present note be modified and relocated as new Note 2.

The members of the committee on Prices for Labor and Materials are T. J. Boring (chairman), general foreman, M. C. B. Clearing House, Penn.; P. F. Spangler, (vice-chairman), assistant superintendent motive power, St. L.-S. F.; J. D. Rezner, superintendent car department, C. B. & Q.; L. B. George, assistant chief motive power and rolling stock, Can. Pac.; G. J. Flanagan, general car inspector, N. Y. C.; J. J. Root, Jr., vice-president, Union Tank Car Company; A. H. Gaebler, superintendent car department, General American Transportation Corporation; and G. R. Andersen, superintendent car department, C. & N. W.

(The report was accepted.)

Safety Appliances

This committee has continued to handle subjects pertaining to safety appliances assigned it by the General Committee, as well as questions referred by other committees and member roads. It also has continued to review safety appliance arrangements and details proposed for installation on tank cars. This work is rapidly becoming voluminous. Means are being devised which, with the co-operation of the tank car manufacturers, should minimize this work.

The proposed specifications and requirements for power brakes of the load compensating type for freight service, as well as the replies received from voting members to circular letter dated January 31, 1949, have been reviewed in detail.

After a thorough discussion of the proposed specifications and a careful review of the performance of the ABLC brake applications now in service, this project was referred to the air-brake manufacturers for further development before progressing this type of brake or submission of the proposed specifications and rules to the members for adoption.

The report was signed by Chairman R. G. Henley, general superintendent, motive power, N. & W.; H. T. Cover, chief motive power, Penn.; G. W. Bohannon, chief mechanical officer, C. & N. W.; F. K. Mitchell, manager of equipment, N. Y. C.; J. W. Nicholson, director, department of research, A. T. & S. F.; and A. K. Galloway, general superintendent motive power and equipment, B. & O.

(The report was accepted.)

Development of Hot-Box-Alarm Devices

During the past year the Committee on Development of Hot Box Alarm Devices has continued to review additional devices submitted by individuals and manufacturers, but none submitted was considered to have sufficient merit, or developed to a point where laboratory tests were warranted. As during the previous year, the principal activity of the committee was to continue observations of the four devices undergoing road service tests as installed in solid-bearing-equipped passenger cars in regular service on the Pennsylvania. The table shows the total results of these tests.

Service Experience Reports

The committee has again been furnished with the road experience of the New York Central System during the past year with the Twin-Plex alarm, which is now standard equipment on that railroad for all modern locomotives, both passenger and freight, and all of the newer passenger cars, numbering approximately 800; also on more than 2,000 of the older passenger cars. The Pullman Company has equipped all roller bearing cars assigned to New York Central System service with the Twin-Plex alarm, as well as 1,200 bearings on the older Pullman cars having solid bearings. The New York Central reports that during the past year no burnoffs have occurred of axles having bearings so equipped.

Detailed report from the New York Central System covering the service record with the Twin-Plex alarm during the period March 1, 1948, to March 1, 1949, is shown as Appendix B. [This records 26 true hot-box indications, of which four were on steam locomotives, two on Diesel locomotives and one on each of 20 passenger-train cars.—EDITOR.]

The committee was advised that the Southern Pacific had been experimenting with the Journ-A-Larm system, manufactured by Fenwal, Inc. One Chair car equipped with this system went into service in March, 1948, three baggage-mail

RESULTS TO MARCH 31, 1949, OF ROAD TESTS ON THE PENNSYLVANIA

Alarm equipment	Service months	True Indications	False alarms	Possible false indications	Failures	Equipment defects
Minneapolis-Honeywell	34*	15	16	2	2	15
Union Switch & Signal	40	5	15	3	2	11
Pennsylvania Cartridge	34	11	16	1	2	13
Magnus Metal Twin-Plex	28	0	1	0	1	1

* Service test of Minneapolis-Honeywell device closed as of October 25, 1948, at which date device was removed and returned to manufacturer.

cars in November and December, 1948, and three baggage cars in December, 1948, and January, 1949.

Some trouble was experienced with the original installation on the chair car due to broken conductors in the Thermoswitch to truck cables. No trouble has been experienced with the system as installed on the six new head-end cars recently placed in service, with the exception of one false alarm, cause unknown. These devices are set to operate at 260 deg. F. plus or minus 10 deg. F.

The Southern Pacific has 71 sleeping cars and 108 chair, dining, lounge and other cars on order which will be equipped with the Fenwal system.

Economic Justification

At the January 19, 1949, meeting of the committee the status of its activities was outlined as follows: The committee was not convinced as to the economic justification of the relatively expensive electric type hot box alarm device applicable to passenger cars only. Its ultimate objective is the development of a relatively simple, effective, and reliable device, applicable to both passenger and freight equipment cars and to both solid and roller type journal bearings. The committee intends to continue its efforts to encourage some individual or organization to design or develop such a device.

The members of the committee are J. R. Jackson (chairman), mechanical engineer, Mechanical Division, A. A. R.; M. A. Pinney, engineer of tests, Penn.; H. L. Holland, assistant mechanical engineer, B. & O.; J. Stair, Jr., electrical engineer, Penn.; H. T. Rockwell, assistant engineer, N. Y. C.; and L. H. Sultan, electrical engineer, S. P.

(The report was accepted.)

Specifications for Materials

The committee recommended that changes and revisions be made, or that new specifications be adopted, for the following numbered items and submitted to letter ballot: M-101, M-111, M-112, M-116, M-126, M-127, M-129, M-130, M-601, M-609, M-610, and M-613. Two changes were made by emergency action of the General Committee in Specifications M-107, and these became effective March 7. In specifications M-402 on malleable-iron castings, the committee requested that the A.A.R. committees having jurisdiction over equipment designs give consideration to the most desirable grade of malleable castings for railroad use; the grade adopted is not available from a large number of suppliers.

Three railroads and three producers are co-operating on tests of light aging of rubber, which to date have indicated the superiority of Neoprene. Since most hoses fail from mechanical damage rather than light aging, the committee does not feel that the additional cost of Neoprene is warranted except under special conditions.

General

The committee unanimously adopted the following standard rejection clause, which will be uniform for all specifications written or revised subsequent to this action:

"Material which shows injurious defects subsequent to its original inspection and acceptance at the manufacturer's works or elsewhere will be rejected, and the manufacturer shall be notified."

The committee gave consideration to the preparation of specifications for Diesel crank-case oil but no agreement was reached on the proper approach to the subject. However, a study of the subject indicated the necessity for continued effort and the matter will be given further consideration.

Firebox and Boiler Steels

The co-operative research program to determine the effect of residuals on the quality and performance of firebox and boiler steel was continued. The total number of samples received represent 36 fireboxes and 32 boilers. Member railroads are requested to submit additional specimens from boilers and fireboxes which have given extended service—25 years or more, if possible. The life range of samples now available is from 1½ years to 31 for boiler steels and from 8 months to 35 years for fireboxes.

In addition to complete analysis and micro examination of cracks, eight samples have been analyzed for gas content. There was only the slightest difference in gaseous content of steels that have had excellent to poor service life.

Additional samples are needed to extend the data available for semi-killed and alloy steel, so that the variations in residual alloys can be more accurately compared with service life. The steel manufacturers are now completing their studies on the effect of physical properties.

The committee recommended that this study be continued.

The members of the Committee on Specifications for Materials are: H. G. Miller (chairman), mechanical engineer, C. M., St. P. & P.; W. F. Collins (vice-chairman), engineer of tests, N. Y. C.; T. D Sedwick, engineer of tests, C. R. I. & P.; H. G. Burnham, engineer of tests, N. P.; H. P. Haas, director of tests and research, N. Y., N. H. & H.; M. A. Pinney, engineer of tests, Penn.; R. W. Seniff, engineer of tests, B. & O.; E. B. Fields, engineer of tests, A. T. & S. F.; R. McBrian, engineer of standards and research, D. & R. G. W.; L. S. Crane, engineer of tests, S. P.; G. E. Baumgardner, assistant research engineer, N. & W., and P. H. Smith, engineer of tests, C. B. & O.

Discussion

E. K. Bloss, mechanical engineer, Boston & Maine, asked if the committee has given any consideration to change in the material specifications for forging steel to limit the copper content, as copper causes difficulty in forging. Chairman Miller answered in the negative and said that if any member road has information which it can back up, bearing on necessary copper limitations for successful forging, the committee will appreciate receiving it.

(The report was accepted.)

Changes in Interchange Rules

During the year Cases 1829 to 1832, inclusive, have been decided and copies forwarded to members. The principal changes recommended in the report follow. None was considered to necessitate submission to letter ballot.

Rule 3

No extension beyond Jan. 1, 1950 was recommended for the following requirements in Rule 3:

1—Paragraph (j-3), requiring journal box lids having Certificate of Approval on all cars built new or rebuilt.

2—Paragraph (t-10), requiring permanent metal holders for placards on tank cars carrying inflammable, poisonous and dangerous commodities, etc.

3—Paragraph (w-3), prohibiting the use of single plate, non-bracketed cast-iron wheels, cast prior to 1938.

With the concurrence of the Committee on Car Construction and the Committee on Couplers and Draft Gears, the addition of new Paragraph (c-13) to Rule 3 was recommended, requiring that vertical space between top of coupler shank and under surface of striking face of striker casting on cars must not exceed 1½ in., effective January 1, 1952, from owners. This does not apply to Type F Interlocking Couplers.

With the concurrence of the Committee on Car Construction and the Committee on Couplers and Draft Gears, new Paragraph (g) and new Fig. 5 were recommended for addition to Rule 20, outlining method of adjustment where the vertical space between top of coupler shank and under surface

of striker casting on cars exceeds 1½ in.

Modification of the note following Paragraph (10-k) of Rule 32 was recommended, to provide handling line responsibility for center sills bent or buckled in excess of 2 in. within a space of 6 ft., between body bolsters, instead of in excess of 2½ in. between body bolsters where caused by the application of open flame to facilitate unloading.

With the concurrence of the Committee on Car Construction, modification of Paragraph (c) of Rule 49 was recommended, to provide standard locations for cardboards on cars.

With the concurrence of the Committee on Brakes and Brake Equipment, new Note 5 was recommended for addition to Paragraph (1) of Rule 60, providing for the arbitrary renewal of certain types of gaskets, etc., when type AB air brakes are given periodic attention, because of the trouble which such parts have given on cars during cold weather.

Addition of new Paragraph (c) to Rule 61 was recommended, to provide for the lubrication of center plates and friction type side bearings on the end for ends of cars which are on repair tracks and jacked for other work, in order to eliminate excessive binding when passing over curves.

The effective date of the following requirements in Rule 3 was recommended for extension from Jan. 1, 1950, to Jan. 1, 1951:

Section (a), Paragraph (6)—Air brake pipe clamps: J-bolt type.

Section (a), Paragraph (7)—Air brake pipe clamps: U-bolt type.

Section (b), Paragraph (7)—Brake levers: metal badge plates.

Section (b), Paragraph (9)—Braking Power: braking ratio.

Section (c), Paragraph (11)—Couplers having 5 x 7 in. shanks.

Section (c), Paragraph (12)—Couplers, lock lift lever and toggle.

Section (u), Paragraph (4)—Class E-3 Cars: prohibition in interchange.

The extension in effective date of requirement in Paragraph (a-4) has been referred to the General Committee.

Paragraph (t) (3-f) was recommended to take effect Jan. 1, 1951, instead of Aug. 1, 1949.

The committee recommended that present Par. (t-1) of this rule be modified and new Par. (1-1-b) added, effective Aug. 1, 1949, as follows:

Proposed Form: (t) (1-a) Trucks, new, when applied to any car *between Mar. 1, 1930, and Jan. 1, 1950,* shall be equipped with cast-steel side frames conforming to current A.A.R. Specifications, and shall have month and year manufactured, also the letters "A.A.R." or "A.R.A.," followed by the year date of specification, cast on the outer face. From owners.

(t) (1-b) Trucks, new, when applied to any car on or after Jan. 1, 1950, shall be equipped with cast-steel side frames conforming to current A.A.R. Specifications, and shall have manufacturer's initials or symbol, month and year manufactured, also the letters "A.A.R.-B" or "A.A.R.-C", followed by A.A.R. assigned identification number, cast on the outer face. From owners.

Reason: To provide marking requirements for side frames in line with A.A.R. Specifications, as recommended by the Committee on Car Construction and approved by letter ballot.

Rule 4

The committee recommended that Paragraph (4) of Section (f) of Rule 4 be modified as follows:

Proposed Form: (4) Metal posts, metal stakes, metal braces, or their substitutes: Cut through to a depth of more than one-third from outer edge to inner edge, on two or more of any of these members on same side of car.

Rule 9

The committee recommended that a new requirement be added opposite caption "General" in this Rule, effective Aug. 1, 1949, to read as follows: *When wheels, truck sides, truck bolsters, journal boxes, friction bearings or wedges are R. & R. or R., or journal boxes repacked, the billing repair card must show whether or not car is equipped with approved packing retainer devices.*

Reason: Because of modifications of Rules 65 and 66 which were made to encourage the replacement of approved packing retainer devices where R. & R. in connection with repairs to car, and to afford protection to car owner where repairing line fails to do so.

Rule 11

To harmonize with Car Service Rule 11, revised by the Operating-Transportation division, Paragraph (1) of Section (B), Rule 30, was modified as of Jan. 1, 1949, by circular letter of Dec. 31, 1948, to change the periodic relight-weighing and restenciling of freight cars as follows:

Type of Car	First Reweighing at Expiration of	Subsequent Reweighing at Expiration of
Composite wood and steel underframe	15 mo.	48 mo.
Steel underframe, with wood, steel or composite superstructure frame	15 mo.	48 mo.
All-steel open-top cars, including all steel flat cars, and type LO covered hopper cars	30 mo.	30 mo. (no change)
All-steel house and all-steel stock cars	30 mo.	48 mo.
Refrigerator cars	30 mo.	48 mo.

Rule 17

The committee recommended that present Interpretation (B-8) to this rule be modified in the next Supplement, as follows:

Proposed Form: (B-8) Q.—When brake-beam or bottom-rod safety supports are removed in connection with repairs or renewal of spring planks, brake beams, wheels or truck bolsters, is the repairing line required to reapply such supports? A.—Yes. Where spring planks, brake beams, wheels or truck bolsters have been R. & R. or R., repairing line, upon presentation of joint evidence *within one year from date of repairs* that the truck is not so equipped, must furnish defect card for labor and material of such supports unless repair card states *that the supports were R. & R., not R. & R., or were renewed account of defective or missing.*

Reason: To clarify the intent.

Rule 65

The committee recommended that this Rule (delivering company responsible) be modified, effective Aug. 1, 1949, as follows:

Proposed Form: Missing journal bearings and journal wedges, either or both; journal bearings (regardless of previous condition), journal wedges, journal-box bolts and dust guards which require renewal, *also approved packing retainer devices, if standard to car,* when delivering company is responsible for change in wheels and axles.

Reason: To encourage the replacement of approved packing retainer devices where R. & R. in connection with repairs to car, and to afford protection to car owner where repairing line fails to do so.

Rule 66

The committee recommended that present Interpretation No. 4 to this rule be modified and new Note following added, effective Aug. 1, 1949, as follows:

Proposed Form: (4) Q.—Is any penalty provided for failure to replace *approved* packing retainer devices *removed account R. & R. or R. of wheels, other truck parts,* or *account of* jour-

nal boxes repacked? A.—*Yes. Such devices, if in servicable condition, must be replaced or defect card issued covering labor and material. If defective, or if missing when standard to car, same should be renewed in kind. Charge on basis of Rule 105 may be rendered against car owner except when the renewal is due to delivering line responsibility. If not renewed in such cases, the billing repair card shall so state. Missing or defective packing retainer devices are not cardable in interchange. Note.—A solid white block not less than 1½ in. square stenciled under the word "REPKD" covering periodic repacking of freight and passenger equipment cars, should be used to indicate car is equipped with approved packing retainer devices.*

Reason: To encourage the replacement of approved packing retainer devices where R. & R. in connection with repairs to car, and to afford protection to car owner where repairing line fails to do so.

Rule 70

The following new Section (g) was proposed for addition to Rule 70:

(g) Where one-wear wrought-steel wheels are applied by intermediate line, on authority of defect card for cut journal, in place of cast-iron wheels standard to car, in servicable condition, bill shall be rendered against the car owner, who shall render counter-bill versus road which issued defect card, for the difference between secondhand value of cast-iron wheels removed and value of new, secondhand or turned one-wear wrought-steel wheels applied.

Rule 93

The third paragraph of Rule 93 was proposed for modification to reduce operations and to clarify the intent.

Rule 95

The first two paragraphs of Rule 95 were recommended for change as follows (italics indicate changes or additions):

Proposed Form—Labor, *and the difference between new and secondhand value when new material is applied,* shall be charged against car owner for replacing the following details in kind (or by substitution of other materials), when lost on the line of the company making the repairs and the condition of such missing details is unknown:

Coupler, including yoke *and rivets, end filler and rivet,* springs and followers (any or all), when lost with coupler; except when draft gear is in place and the coupler and its yoke is missing, material *(new or secondhand, less scrap)* for such yoke and its rivets may be charged against car owner.

The last paragraph of Rule 95 was proposed for the following modification:

Proposed Form—If car bears no previous marking for type of couplers or draft gears, the betterment charge will depend on coupler or draft gear found on other end, unless the car owner furnishes authentic record showing previous application of D or E coupler or approved or non-approved type draft gear to the end against which such betterment charge is made. *This will also apply to high tensile (HT) type E knuckle and lock when coupler at other end of car is not so equipped.*

Rule 98

The last sentence in the last paragraph of Section (f), Rule 98 was proposed for the following changes:

The same *billing* procedure shall be followed in the case of repairs covered by defect card of another company, when *cast-iron and one-wear wrought-steel wheels are substituted for each other.*

Rule 101

To indicate that hinged-type doors only are intended, Items 151 and 152 of Rule 101 were proposed to be changed by the addition of the words "hinged type" where appropriate. A new Item 172 was proposed for addition to this rule to provide charge for lubrication of center plate and side bearings (friction types only) as required by Paragraph (c) of Rule 61.

Rule 107

The committee recommended that second note following Item 89 of this Rule be modified, effective Aug. 1, 1949, as follows:

Proposed Form: Note.—When four or more journal bearings or wedges are renewed separately and all boxes repacked in accordance with Par. (g) of Rule 66, full charge may be made as specified in Items 169-E to 169-I, inclusive, of Rule 101, with no additional labor charge for journal bearings, wedges or *approved packing retainer devices.*

Reason: Account modifications of Rules 65 and 66 which were made to encourage the replacement of approved packing retainer devices where R. & R. in connection with repairs to car, and to afford protection to car owner where repairing line fails to do so.

Rule 108

The following new Item 24 was proposed for addition to Rule 108 to provide ready reference to "no charge" items:

24. Replacing car on center when no worn, broken or defective parts are involved.

Passenger Car Rules

To provide for the interchange of cars equipped with 2½-in. metallic connectors, passenger-car Rule 2 was proposed to be modified as follows:

(c) Cars which are not equipped with metallic steam heat connectors having *at least* two-inch openings throughout, will not be accepted in interchange.

The effective dates of paragraphs (e) and (f) of Rule 2 were recommended for extension from Jan. 1, 1950, to Jan. 1, 1951.

The committee proposed the following additions to Paragraph (j) of Rule 7, effective Jan. 1, 1950:

Replacement of Armored Type Brake-Pipe and Straight-Air-Pipe Hose—1. All cars equipped for use in passenger train service, when receiving periodic air-brake attention as provided in this rule, must have the brake-pipe hose and straight-air-pipe hose at ends of car removed for inspection and, if to be re-used, same must be inspected and tested as provided in Paragraph 2. All armored type air hose must be removed for inspection when car is given general shopping and, if to be reused, same must be inspected and tested as provided in Paragraph 2.

2. Inspection and testing of lining, armor and fittings of all new or reused hose will consist of the following:

(a) Visual inspection of armor and fittings.

(b) Visual inspection of lining by sighting through hose into a frosted electric light bulb of not less than 150 watts. Turn hose slowly to observe for outstanding shadows in the inner lining. Such shadows will indicate excessive trapped oil or loose lining and, where found, hose must be replaced.
Armored hose having choke in fitting, such as straight-air-pipe hose, shall be sight inspected from both ends.

(c) All brake-pipe hose must then be checked by passing a steel ball of ¾-in. diameter through the hose assembly.

(d) Subject each hose assembly to an air pressure test of 140 lb. while either submerged in water or entirely coated with soap-suds.

Paragraph (2) of Section (1) of the same rule was proposed for the following modification in the next supplement:

Proposed Form—(2) Journal roller bearings which have not received periodic lubrication attention within 30 days as indicated by the stenciling, must be checked and lubricated. This work to be performed in detail as outlined in Freight Car Rule 66-A, except for time periods, Sections (a), (b) and (c), and location of stenciling, per Section (e). The stenciling, as per Section (e) of Rule 66-A, to be located on the truck frame *at diagonal corners of car.* Separate billing repair cards shall

be furnished showing number of boxes, name of road, date of previous lubrication check, or no date, or date illegible, and charge rendered versus car owner in accordance with Item 21-A of Rule 22.

Members of the Arbitration Committee are J. P. Morris (chairman), assistant to vice-president, A. T. & S. F.; J. A. Deppe, superintendent of car department, C. M. St. P. & P.; W. N. Messimer, superintendent of equipment, Merchants Dispatch Transportation Corp.; G. E. McCoy, assistant chief of car department, C. N.; H. M. Wood, assistant chief of motive power (car), P. R. R.; J. J. Root, vice-president, Union Tank Car Co.; M. F. Covert, general superintendent of equipment, General American Transportation Corp.; and G. P. Trachta, general superintendent of motive power, C. R. I. & P.

(*The report was accepted.*)

Geared Hand Brakes

Up to the present time A. A. R. Certificates of Approval have been issued for 25 types of geared hand brakes,—14 vertical wheel type, 8 horizontal wheel type and 3 lever type. These are shown in the table.

Among the year's activities of the committee were a canvass of manufacturers to ascertain whether changes requiring modification of Certificates of Approval had been made in the brakes; test-rack procedure for testing geared hand brakes is being prepared; and a circular was issued calling attention to the importance of proper mating of the brake mechanism with the bell crank when one make of brake is substituted for another.

Certificate of Approval of one Universal Railway Devices Company vertical-wheel brake was revised to permit the use of pressed-steel housing and back plate instead of malleable-iron castings on all Type 5700 brakes furnished in the future. The castings are hard to get.

An independent manufacturer has submitted a wheel design applicable to five of the eight vertical-wheel brakes which can be used for replacements of the standard wheels, deliveries of which are slow. A circular will furnish more complete information.

Injuries to Employees

At a joint conference of the Geared Hand Brake Committee with representatives of Geared Hand Brake Manufacturers and the A. A. R. Safety Section, the hand brake manufacturers agreed to set up an engineering committee, on which each manufacturer would be represented, to consider the possibility of further standardizing features of vertical-wheel geared hand brakes to make A. A. R. Specifications more specific with respect to (1) uniformity of application (operation); (2) uniformity and ease of release; (3) non-spin wheel; (4) standardization of bell crank for use with all makes of geared hand brakes, thus providing interchangeability; and (5) uniform length of brake chain.

GEARED HAND BRAKES FOR WHICH CERTIFICATES OF APPROVAL HAVE BEEN ISSUED

	Number by Types		
	Vertical-wheel	Horizontal wheel	Lever type
Ajax Hand Brake Co.	1	..	..
Amer. Car & Fdy. Co.	..	1	..
Canadian Cardwell Co., Ltd.	..	1	..
Klosing Hand Brake Co.	2	..	1
Superior Hd. Brake Co.	1	2	..
The Orme Co. (Champion Brake Div.)	2	..	..
Union Asbestos & Rubber Co. (Equipment Specialties Div.)	1	1	1
Union Railway Equipment Co.	1	1	..
Universal Railway Devices Co.	5	2	1
W. H. Miner, Inc.	1	..	..
Total	14	8	3

These features also are to be taken into consideration with reference to Specification for Horizontal Wheel Hand Brake, where applicable, and the standardization of bell crank also applies to the Lever Type Brake. It was also recommended that Specification for Lever Type Brake incorporate a requirement for a safety stop to prevent rotation of the lever beyond the release position.

To avoid confusion in identifying type of hand brake, due to interchange of brake wheels, it was suggested for consideration that manufacturer's name or type designation be omitted from all brake wheels.

Suggestion has been made to the Committee on Train Service Accidents that consideration be given to developing a standard set of instructions for operation of various kinds of hand brakes, based on instructions now in effect on certain railroads.

The members of the committee are, E. P. Moses (chairman), engineer car equipment, N. Y. C.; J. P. Lantelme, general foreman, Penn.; H. L. Holland, assistant mechanical engineer, B. & O.; R. G. Webb, superintendent air brakes, C., M., St. P. & P., and J. R. Jackson, mechanical engineer, Mechanical Division, A. A. R.

Discussion

A member raised a question about the use of bell cracks which are interchangeable, but Chairman Moses cautioned against this practice, as the lever ratios will in many instances be changed.

(*The report was accepted.*)

Brakes and Brake Equipment

The committee reported on 11 subjects and listed 12 additional items which are now under investigation.

Cleaning Experimental AB Brakes

All reports in response to Circular D.V.-1082 of Feb. 15, 1945, with respect to cleaning air brakes on cars still in service equipped with "Experimental AB Brakes" are in and tabulation is under way.

Brake-Pipe Leakage

Numerous reports of excessive brake-pipe leakage on freight-train cars during extreme cold weather this past winter have been received, which investigation indicates was caused in most cases by AB pipe bracket and valve gasket.

Instructions issued in July, 1948, to reduce excessive winter brake-pipe leakage are being amplified and a subcommittee will cooperate with gasket manufacturers in cold-room tests.

A number of synthetic rubber gaskets applied during the war are still in service which fail during cold weather. To insure the removal of these parts from service the Arbitration Committee has been requested to add a new note to Section 1 of Interchange Rule 60 which requires that certain AB brake gaskets are to be renewed, regardless of condition whenever the brakes receive periodic attention, and to continue it in effect until the committee is positive that gaskets are available which are capable of satisfactory performance for more than the 36-month cleaning period.

AB Load-Compensating Brake

The Pennsylvania Saug Hollow Branch tests of July and August, 1948, disclosed modifications in the load-compensating brake equipment which it is believed will improve service performance. These changes are being worked out with the air-brake manufacturers and may lead to further tests.

Gauge for Hose Fittings

A go-no go gauge for condemning air-hose coupling and nipples is proposed by the committee, for adoption as standard

practice, to prevent brake-pipe hose coming off fittings or having linings injured by oversize or damaged shanks or beads. The drawing of the gauge shown in the report is accompanied by instruction for its use.

Pipe Failures

The committee presents reports from 55 railroads and 50 private car owners who are using Wabcoseal or welded fittings on cars equipped with AB brakes. These owners report 18,263 cars with Wabcoseal fittings ranging in size from ⅜ in. to 1¼ in., of which 13,984 are ¾ in.; and 2,071 with welded fittings, all but 5 of which are ¾ in. Wabcoseal fittings will be applied to 9,764 more cars and welded fittings to 68 by these same owners.

Wear in AB Release Handle

The committee has requested the manufacturers to increase the size of cotter pins in the AB valve release handles from ¼ in. to 5/16 in. and to increase the thickness of the jaws to provide more bearing area.

Mounting Armored Type Air Hose

The committee recommends for letter-ballot action the extension of the Instructions for Mounting New Brake-Pipe and Straight-Air Pipe Hose to apply to armored typed hose, for which there are now no instructions.

Periodic Inspection of Armored Hose

The committee recommends that the Arbitration Committee insert revised instruction for the inspection and testing of armored brake-pipe and straight-air hose in Passenger-Car Interchange Rule 7 to require that all armored type air hose be removed for inspection when car is given general shopping. Instructions are given for testing if to be reused.

Standardization of Diesel Brakes

The subcommittee to which this subject was assigned proposes a joint subcommittee including representatives of the Diesel section of the Committee on Locomotive Construction, the locomotive builders and the air brake manufacturers, to consider a list of features of air-brake equipment on Diesel locomotives which might be standardized, with improvement in performance and decreased maintenance cost.

Maintenance of Brake and Signal Equipment

A subcommittee has developed revisions in the air-brake maintenance rules to recognize the high-speed brakes equipped with electro-pneumatic features and to include provisions applicable to locomotives other than steam. After agreement is reached with the I.C.C. Bureau of Safety and it is approved by the Safety Appliance and General Committees, they will be submitted to letter ballot for adoption as standard practice.

Cleaning Period for D-22 Control Valves

Final reports of service tests of D-22 control valves to determine if the cleaning period can be advanced beyond 15 months, have been tabulated. Since the time the test cars were sealed and placed in service the amount of moisture and oil getting into the brake pipe and valves has been reduced, due to improvement made in the main reservoir cooling system and compressor operation on Diesel locomotives. Therefore, if these cars were tested under present day conditions no doubt the number of premature failures and test-rack failures would be reduced.

Based on the results of these tests, and due to the improved maintenance of this type of brake equipment and improvements that are being made to the main-reservoir air system on Diesel locomotives, it is recommended, as a ballot item, that the air-brake cleaning period for cars equipped with D-22 type control valves be established as 24 months.

The committee consists of J. P. Lantelme (chairman), general foreman, Penn.; H. I. Tramblie (vice-chairman), air brake instructor, C. B. & Q.; R. J. Watters, general air brake inspector, N. P.; R. J. Dewsbury, general air brake inspector, C. & O.; R. N. Booker, general air brake inspector, S. P.; W. D. Bowser, engineer air brakes and train control design, U. P.; F. C. Wenk, superintendent air brakes, A. C. L.; D. R. Collins, superintendent air brakes, D. & R. G. W.; F. T. McClure, supervisor air brakes, A. T. & S. F.; A. J. Pichetto, general air-brake engineer, I. C.; L. D. Hays, engineer brake equipment, N. Y. C.; R. G. Webb, superintendent air brakes, C. M. St. P. & P.; C. C. Maynard, chief inspector air brakes, Can. Nat'l; and J. Mattise, superintendent air equipment, C. & N W

Discussion

W. F. Peck, supervisor of air brakes, B. & O.: Under the subject of brake pipe leakage, the committee recommends that the back cover, ball check cover and service valve cover gaskets as well as the quick service limiting valve diaphragm be scrapped as all AB valves pass through shops for cleaning, repairing and testing; this step to be taken to assure the removal and scrapping of certain products made of inferior materials during the war period. If such a plan is adopted, many good parts will be scrapped along with the bad. Symbols identify the parts made of inferior materials, and we are conscientiously scrapping them. The net cost of the four articles (three gaskets and one diaphragm) is $2.23½ per complete AB valve, and this figure does not include freight or storehouse expense. This would be a major item in the cost of repairing AB valves, and we would recommend that the committee permit the re-use of parts known to be satisfactory.

If the full benefit is to be received from the application of new gaskets, there will have to be a general improvement in tightening caps and covers when AB valves are re-conditioned. Also, more care must be exercised when tightening stud nuts securing the service portion and emergency portion to the pipe bracket. All caps and covers have metal-to-metal contact, the proper compression being built into the gasket. There appears to be no excuse for failure properly to tighten them. For our own information, we applied soap-suds to a train in a transportation yard when the temperature was far above freezing, and were surprised to find how many leaks appeared that could be corrected by proper tightening.

We also had trouble in securing the proper caboose pressure on a long train on our Western Region during sub-zero weather last winter. The carmen patrolled the train tightening cap screws and nuts until the principal leaks were corrected and the desired pressure appeared on the caboose gage. New gaskets were unnecessary in this case.

The committee has developed and submitted a shank gage for checking air brake couplings and nipples. We secured such a gage and have been experimenting with it. We notice that many fittings fail to pass the GO gage due to being slightly out-of-round. The difference in the bores of the GO and NO-GO gage is only .072 in. If the gage is adopted as standard, where the fittings possess no defects other than being slightly out-of-round, we plan experiments in reclamation. We believe that such fittings can be heated and squeezed to proper contour in a die.

Any standardization of air brake equipment on Diesel locomotives will be most heartily welcomed by us. We have on our Diesel locomotives: 9 types of air compressors, 8 types of automatic brake valves and 5 types of self-lapping independent brake valves. None of these is interchangeable as a complete unit, although numerous parts may be common to two or more models. Full utilization of the locomotives can be obtained only where an adequate supply of spare devices is maintained. We endeavor to protect ourselves, although at the expense of a high inventory.

This condition is not confined to our railroad nor are the air brake manufacturers unmindful of our plight.

It may be interesting for the members representing mountain railroads to know what we have accomplished to date with the four-position or release-control retainer. We adopted

this device as standard on April 9th, 1942, and applied it to all new cars built as well as existing cars being equipped with type AB brakes. As a result, our percentage of cars equipped with release-control retainers is very high, and they were obtained painlessly. All three-position retainers of the latest type when removed from cars are converted in our shops to the four-position A.A.R. alternate standard.

By the use of slow direct-exhaust position on loaded coal trains and trains of empty open-top cars, we have been able to eliminate eight stops to manipulate retainer handles on one division and three on another. Since so few of the foreign and private line cars operating in our fast freight trains are equipped with release-control retainers, we cannot anticipate the date when we will find the fourth position useful.

E. K. Bloss, mechanical engineer, Boston & Maine: (Presents written comment for R. E. Baker, assistant general manager) Regarding the replacement of AB valve gaskets at times of periodic attention, regardless of condition, the net cost of these gaskets is something over $2.00. Inasmuch as all of the gaskets at these locations are not made of a certain type of synthetic rubber which, as I understand it, are the worst offenders insofar as brake pipe leakage is concerned, it would appear that this replacement of all gaskets is unnecessary. If the instructions previously issued in the July 1948 circular letter were rigidly adhered to this additional cost would be unnecessary.

In connection with condemning gauges for checking the beads and shanks on used 1⅜ in. air hose couplings and nipples, I would like to call your attention to the fact that the new gauge specifies a dimension of 1.723 in. in diameter on the GO end of the gauge.

If you will refer to Page B-52-1948 of the A.A.R. Manual of Standards, the gauge which is already approved for gauging new couplings and nipples indicates a nominal dimension of 1.725 in. so that the proposed condemning gauge for used fittings is so dimensioned that it could reject fittings that are approved by the gauge for new fittings. I do not believe that this dimension is correct.

Referring to standardization of air brake equipment on Diesel locomotives, this subject is certainly worthy of much consideration as we have almost as many different types of air brake equipment as we have different types of Diesel locomotives; and anything that can be done to progress this matter with the locomotive builders would be well worthwhile in the matter of standardization.

I favor the recommendation of extending the cleaning period of the D-22 brake equipment to 24 months, but the committee has not made any recommendation in connection with extending the cleaning period of the UC type of equipment that is protected with strainers.

G. H. Higley, general air brake instructor, Erie: The circular letters on brake-pipe and brake-cylinder leakage on freight cars were followed through to our repair forces. We do not experience the extremely cold weather common in other sections of the country; therefore the leakage troubles due to extreme cold were limited.

Erie cars run through severe cold sections of the country and we are anxious to cooperate fully to eliminate this troublesome condition. It seems to us that a high degree of shop track maintenance is the answer to better performance.

We reclaim no gaskets; the bead on the gasket is important and instead of depending upon judgment, it would seem that a gauge for checking gaskets would be desirable. We heartily subscribe to the committee's recommendation to renew the back cover gasket, ball check gasket, service valve cover gasket and quick service limiting valve diaphragm regardless of condition. The service portion back cover and emergency portion check valve cover should be strengthened to prevent a warped condition. Some governing factor should be set up to limit the amount of pull on cover bolt nuts to tighten.

Results obtained by the AB load-compensating brake road tests were satisfactory and indicate that this brake is a future *must*. Application of replacement parts to the Illinois Central test cars with AB load compensating brake apparently is soon to be undertaken. It is our understanding that the parts to be replaced do not affect the functional aspects of the equipment. Apparently it is questionable that further road tests would disclose anything of significance. The effects of the mechanical improvements on the survival of the equipment over long periods in road service without trouble should be a major consideration.

The adoption of condemning gauges for checking the bead and shank on used 1⅜-in. air hose couplings and nipples should weed out many older pieces not up to present A.A.R. requirements. The present standard testing device for used air brake hose couplings has created an improved condition; it would appear that gauges for the bead and shank should be used.

Service experience with Wabcoseal fittings probably is still in the early stages, but the application of these fittings is increasing rapidly. It will be some time before it will definitely be known what benefit will be obtained from pipe breakage standpoint. Leakage in the ¾-in. pipes between the AB bracket, brake cylinder and reservoirs, due to broken threads in the flange fittings continues to be troublesome and difficult to detect, but can easily and quickly be repaired without taking cars out of service, by use of the Wabcogrip or Flexigrip fittings. Their use has proved satisfactory. The recommended instructions covering replacement of armoured-type brake pipe and straight-air pipe hose have been prepared as the result of considerable experience and service trial and are consistent with those for hose other than ramoured type.

Satisfactory progress has been made in standardization of the brake equipment (24 RL) on Diesel road power, freight and passenger. We sometimes question whether the builder gives proper consideration to the fact that the brake equipment must be removed from time to time for cleaning and testing. As regards advancing the cleaning date of D-22 control valves, I have no doubt that in many sections the recommended 24 months will be satisfactory. Proper draining of reservoirs at terminals en route with Diesel locomotives may show a marked improvement in the overall performance of the D-22 valve.

F. G. Moody, superintendent car department, Union Pacific, said that gasket trouble in AB equipment is serious under severe winter conditions, often necessitating reduction of train length in order to get out of town and yet these valves show up OK on the test rack at normal temperatures. This opinion was concurred in by R. G. Webb, superintendent of air brake, Milwaukee, who stated that the four caps on AB valves can distort as much as .010 in. under extreme low temperatures and improper tightening.

C. D. Stewart, Westinghouse Air Brake Company, said that the brake companies attempt to give railroads what they want in the way of equipment; the 24-RL brake for Diesel locomotives may be assembled in 200 different piping variations, all of which are requested by one or more customers. He is in sympathy with retaining all gaskets which seem to be serviceable and explained that synthetic gaskets, now giving trouble, were the only kind available during the war. He advocated a gauge for condemning gaskets on a thickness basis.

(*The report was accepted.*)

Lubrication of Cars and Locomotives

Roller-Bearing Lubricants

Since the 1948 annual report continuance of the studies of roller-bearing lubricants has been progressed at the Indian-

apolis Lubrication Laboratory under the general direction of the mechanical research office. These studies, continuing through January, 1949, include both oil and grease lubricants used with six different 5½-in. by 10-in. railway roller bearing assemblies.

A procedure designed to evaluate and compare the performance of the different oil and grease type roller-bearing lubricants was developed to subject the bearing-lubricant combinations to controlled accelerated conditions simulating service on the railroad. The procedure followed was designated the H-C Schedule and required one week for each bearing-lubricant combination studied. Working to this schedule, four days are devoted to the operation of the test machine to a definite time-speed schedule; the remaining time in the week to preparation and temperature control of the bearing-lubrication combination under study. Two each of the four days of actual test machine operation are devoted to duplication of the schedule under cold- and hot-room conditions, providing a check of results under sub-zero and summer atmospheric temperature conditions. Each day's schedule comprises the same series of initial starting (static) friction measurements, accelerations, speed levels and drops, reversal in direction of rotation, and a final recheck of static friction.

The series of abrupt speed drops to 10 mph made from the elevated lubricant temperature and low viscosity levels provides a graduated measure of range and capacity for each bearing-lubricant combination under study and a basis for evaluation and comparison with other combinations subjected to the same condition.

Chart recordings of speed, temperatures, torque, and power input are made for each run and recordings of essential and pertinent data made on log sheets at designated time-distance locations on the H-C (hot-cold) Schedule. The third progress report covering this roller bearing lubricant research program is in preparation by the mechanical research office.

At the October, 1948, meeting, based on a memorandum dated December 15, 1948, from the mechanical research office, the committee recommended requirements for the lubrication of journal roller-bearing units on freight and passenger equipment cars to the Arbitration Committee for incorporation in Paragraph (j) of Rule 66-A. These recommendations, approved by the Arbitration Committee, are as follows:

Rule 66-A (j). The grade of oil used in oil lubricated journal roller-bearing boxes must conform to A. A. R. Specifications M-906 for new car oil, preferably all-year grade. NOTE: Until an A. A. R. specification is adopted, the grade of grease approved by the roller-bearing manufacturer should be used.

Further studies of grease type lubricants at the Indianapolis laboratory have been authorized.

Oil and Waste Research

The research program mentioned in the 1947 annual report has been approved and is being progressed at the Indianapolis lubrication laboratory as a budget-item project under the general direction of the mechanical research office through a resident representative stationed at the laboratory.

During the year representative samples of waste threads commercially available for journal packing and waste mixtures, as recommended by several journal-packing waste manufacturers, have been assembled, purchased from six representative waste manufacturers.

After study of the problem of a comparison and evaluation of the types and mixtures of waste threads, it was decided that the dynamic approach offered the best means for developing the essential facts under comparable conditions. By reason of the variety and number of thread types and mixtures, along with the possible variation in the oils making up the packings to be compared and evaluated, it was decided to construct a four-spindle (8 half-size 2¾-in. by 5-in. journals) testing machine to be utilized as a screening medium preliminary to final tests of the most promising waste-oil packing combinations on the full-size testing machine.

The temperature control room at the Indianapolis Lubrication Laboratory is utilized, both for the screening tests on the half-size machine and for the final tests on the full-size machine, to study the behavior of the packings over a wide range of atmospheric temperatures.

For the final laboratory evaluation of the all-around most effective waste-pack combinations, waste pads, or other means for lubricating the solid type bearing in the conventional journal box assembly, the Hot-Cold (H-C) Schedule developed at the Indianapolis Lubrication Laboratory for comparison of railway equipment roller-bearing-lubrication combinations will be followed. This procedure affords a direct comparison of starting and running frictions, power input, temperatures, etc., between the roller and solid type bearings for railway equipment service.

Progress reports covering these laboratory studies of lubricating media and materials will be issued by the mechanical research office from time to time as the data becomes available.

Journal-Box Lids

To clarify the intent that designs of journal-box lids of deep-flange type are permissible under Specification M-120, the secretary has been instructed to modify Paragraph 4(b) in the next issue of revised manual pages.

Up to the time this report was sent to press, the following makes of lids have been formally submitted, tested, approved and been awarded Certificates of Approval: (The committee here listed a total of six American Locomotive Company journal box lids, two Davis Brake Beam lids, four Motor Wheel Corporation lids, three National Malleable lids, three Symington-Gould lids, and two Union Spring & Manufacturing Co. lids, 5-in. by 9-in., 5½-in. by 10-in., also 6-in. by 11-in. lids being specified.)

The matter of reclaiming journal box lids should be the responsibility of each individual railroad, with due consideration to the economics involved, and such reclamation should not be prohibited, the report stated. It is understood that these reclaimed lids will meet current Specification M-120. However, if applied to foreign cars, charge will be restricted to 50 per cent of gross value new, less credit for part removed, as provided in Rule 104 of the Rules of Interchange.

Service tests of various combinations of journal-box closures, journal boxes being operated in similar service with various lid closing pressures, with and without dust guards, and also with and without auxiliary devices such as deflecting strips and hooded extensions, are still in progress.

Periodic Journal-Box Attention

Recommendation for reduction in the time limit for periodic attention to journal boxes, in an effect to improve the hot-box performance, has been given careful consideration. It is the committee's firm belief that the answer to hot-box prevention lies along the lines of close supervision and good workmanship in servicing journal boxes rather than changing the date limits.

Hot-Box Statistics Renewed

Effective January 1, 1949, the General Committee directed that information again be collected covering number of freight cars set off between division terminals on account of hot boxes and number of miles run per hot box set off. While this basis will not permit comparisons between a high-speed multiple-track railroad and a light-traffic railroad, it will afford a comparison by each railroad with its own former performance.

Lubrication Manual

It is suggested the proposed Lubrication Manual be included in the 1949 annual report, with recommendation that it be submitted to letter ballot for adoption as standard practice to supercede present Standard Method of Packing Journal Boxes as shown on pages L-35 to L-36B in the A. A. R. Manual of Standard and Recommended Practice, as well as the following: Page L-91—Specifications for Packing Tools for Journal Boxes; page L-92—Packing Iron and Packing Hook Drawings; page L-92A—Standard Inspection of Journal Boxes; page L-93—Passenger Car Lubrication; page L-94—Standard Method of Reporting Hot Boxes.

[The text of the proposed A. A. R. lubrication manual included with the report is made up of an introduction and 14 sections under the following titles: Materials, Preparation and Handling of Packing, Reclamation of Packing, Handling of Journal Bearings, Tools and Facilities, Preparation of Journal Boxes and Associated Parts, Packing Journal Boxes, Servicing Journal Boxes, Attention at Originating and Classification Terminals, Attention at Intermediate Points, Periodic Attention to Journal Boxes, Causes of Hot Boxes, Attention to Repairs to Hot Boxes, and Definition of a Hot Box for Reporting Purposes.—Editor.]

Based upon reports from the A. A. R. Mechanical Inspection Department that numerous cases are being found where system cars are being outshopped and otherwise released for service though long overdue for, and very much in need of, journal-box attention, it is suggested that the Arbitration Committee consider a rule to prohibit the interchange from car owner of empty cars overdue for periodic journal-box attention.

It is suggested that the Committee on Specifications for Materials consider that a requirement for winter thinner or cut-back oil be added to Spec. M-906.

The members of the committee are R. E. Coughlan (chairman), chief metallurgist and engineer tests, C. & N. W.; E. H. Jenkins (vice-chairman), assistant general superintendent car equipment, Western Region, Can. Nat.; E. C. Ellis, superintendent car department, C. & O.; A. J. Pichetto, general air brake engineer, I. C.; W. G. Aten, mechanical inspector in charge of lubricating matters, C., B. & Q.; D. C. Davis, lubrication supervisor, A., T. & S. F.; M. A. Pinney, engineer of tests, Pennsylvania; H. T. Rockwell, assistant engineer, N. Y. C.

Discussion

F. G. Moody, superintendent car department, N. P., expressed the opinion that while the recommendations in the report are of great value they can not accomplish the purpose for which they were designed unless chief mechanical officers take the necessary steps to enforce compliance. Mr. Moody called especial attention to the matter of hot box performance with the suggestion that if present rules were enforced and recommended practices carried out, a substantial reduction in the number of hot boxes would be effected. Mr. Moody called attention also to the increase in car miles per hot box between 1929 and 1940 during which period the mileage increased from 43,714 to 210,198. From 1940 to date, however, with exception of 1943, the performance has become worse each year, the car miles per hot box having dropped from 210,198 in 1940 to 91,938 in 1948. He stated further that hot boxes have a definite relation to mechanical condition of wheels, bearings, boxes, etc., and raised the question as to what might be done to improve the situation.

J. A. Deppe, superintendent, car department, Milwaukee Road, in commenting on lubricants for roller bearings, suggested caution in recommendations for lubricants. He commented on the feeling on the part of some mechanical men that where grease is now being used it is not considered necessary to make frequent checks of the contents such as the case when oil is used. He commented that in his experience, periodic checking of the lubricants in roller bearing boxes, aside from determining the proper quantity of lubricant in the boxes, makes it possible to detect conditions such as spalling or flaking of rollers or races. "Where grease is used," he said, "as a lubricating agent, it would seem that detection of such defective conditions would be difficult even if inspection were given boxes between wheel changes, because it would be expected that particles of oil flaking from the bearings would be suspended in the grease and not so readily detected with the use of magnetized gauges or feelers as is possible where oil is used."

A. J. Pichetto, general air brake engineer, I. C., repeated the frequently made recommendation that transportation officers should mark up trains sufficiently in advance so that mechanical men would have the time properly to inspect and service journal boxes before departure. Sufficient time and enough oilers at terminals would contribute to better hot box performance. Mr. Pichetto commented on the item in the report defining a hot box for reporting purposes and suggested that the recommended method would not give a true picture of the number of hot boxes because many railroads rebrass cars between terminals without setting the car off and therefore were not counted. It was suggested that the best rule is to count all hot boxes if the information is to be used for comparative purposes.

L. J. McLain, traveling car inspector, D. & H., agreed with the committee's conclusion that the time limit for periodic attention to journal boxes should not be reduced and that hot boxes can be minimized through close supervision and good workmanship. He cited a check which he had made in recent months. One involved 8,193 cars of various ownership of which 11.6 per cent were overdue for periodic repacking while another check of 3,530 set out for hot boxes showed that 35 per cent had developed in the first six months after the date of repacking and 14.2 per cent developed after the 15 months repack period.

R. W. Seniff, engineer of tests, B. & O., said railroads must change their thinking on Diesel locomotive lubrication and the best backlog of practice is in the hands of automotive engineers.

J. A. Welsch, superintendent of equipment, I. C., said that this road has been mixing Diesel oils without ill effect and he thinks it is the sales representatives rather than technical men of oil companies who say it shouldn't be done.

(The report was accepted and recommendations submitted to letter ballot.)

Car Construction

The committee reported that of 33,905 box, auto-box and hopper cars ordered during the year ended April 30, 1949, 7,200 hopper cars were not of A.A.R. design and the remaining 26,705 were A.A.R. throughout or conformed thereto in most characteristic details, with variations for lightweight alloy-steel, floating center sills, and inside dimensions to meet specific conditions. Of 49,679 cars of all types, including gondolas, flat, ballast, stock, refrigerator and special types of cars ordered during the same period, 95.55 per cent have the standard centerplate height of 25¾ in.

Approval of New Freight Designs

During the year ended April 30, 1949, the committee approved for interchange service, according to the first paragraph of Interchange Rule 3, eight new freight-car designs of untried types, from which a total of 394 cars are to be built.

Variations from Conventional Freight Designs

The committee has been advised by the secretary of the

division of 11 cases of variations from conventional designs involving 9,605 cars for eight railway or private car owners. These do not constitute "untried designs" under Rule 3 and are submitted to the secretary for inclusion in his files as a matter of record.

Standardization

The General Committee of the Mechanical Division directed the Committee on Car Construction and the Committee on Passenger Car Specifications to consider greater standardization of passenger cars with the Committee on Car Design of the American Railway Car Institute. Study is now being made by the Committee on Car Design.

The A.A.R. made a check of new freight equipment being built. It was found there was considerable variation between standard drawings now shown in the Supplement to the Manual and cars built for the various railroads. Some of the railroads follow A.A.R. Standards closely, but others deviate in general dimensions of the car as well as in a number of details. The Committee on Car Construction directs attention to the importance of building and maintaining standard cars, thereby reducing initial costs, expediting delivery schedules and reducing cost of inventories of repair parts.

A study is being made of a list of details which the A.R.C.I. proposes as improvements over the construction now shown in the Supplement to Manual which would increase production and reduce cost.

Two changes are proposed for submission to letter ballot:

(1) Eliminate the 7-ft. doorway for box and auto-box cars from both 40-ft. 6-in. and 50-ft. 6-in. cars. This is seldom used and, where used, the 8-ft. opening can be used in future.

(2) Revise hopper-car drawings (both 50-ton and 70-ton) in the Supplement to Manual to show body bolsters consisting of 68-lb. I-beams in place of the built-up construction now shown.

Trucks for High-Speed Freight Service

During 1948 the cooperative research program with the freight truck and snubber manufacturers under the general direction of the A.A.R. Mechanical Research Office was approved and a series of road tests made on the Illinois Central out of Clinton, Ill. The completely instrumented five-car service laboratory, as built for American Steel Foundries for its research activities, was leased and A.S.F. trained technical personnel, augmented by A.A.R. personnel, was employed.

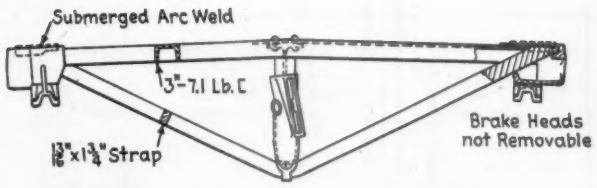
During the period between July 27 and November 13, 1948, a total of 78 road tests were run, recording the vertical and lateral shocks within one car equipper progressively with various truck bolster springs, unit snubbers, package snubbers, and special designs of freight trucks, as compared with a duplicate car under which one set of trucks was maintained throughout the test program.

This road-testing program was not completed during 1948, but it is to be continued during 1949 to complete tests of other snubbers and truck designs, and to include trucks having roller-bearing journals for comparison with the conventional solid-type bearings under the test train during the 1948 tests.

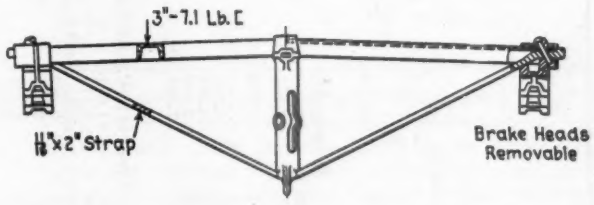
A preliminary summary report tabulating the results of the 1948 road tests completed with the all-coil (four) bolster truck-spring arrangements or combinations, unit snubbers (seven), package group snubbers (four), and special truck designs (seven) accompanied the report.

Side-Frame Clearance

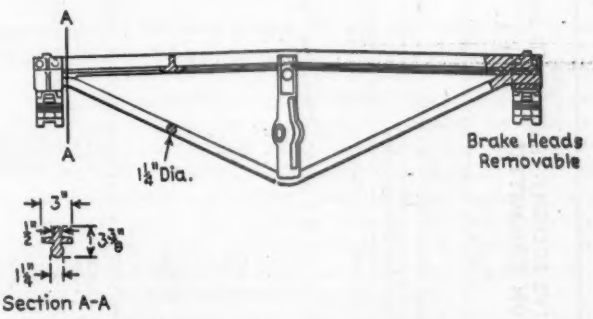
The subcommittee recommends that the dimension of 29¾ in. maximum from top of rail to the top of side frame for trucks with a center-plate height of 25¾ in., as now shown on Manual page D-12, remain unchanged and that a dimension of 4⅞ in. minimum from top of rail to bottom of side frame be added.



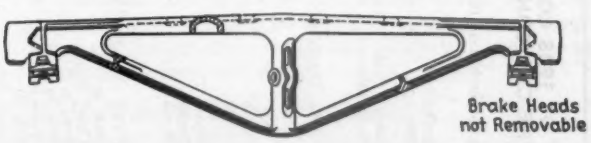
No. 501 approved welded unit-type brake beam



No. 102 approved brake beam



No. 106 approved one-piece forged-truss brake beam — No. 504 is similar, but unit type



No. 503 approved cast-steel unit-type brake beam

To obtain sufficient clearance between the body bolster and the A.A.R. standard side frame with a maximum height of 29¾ in. when using 3 11/16-in. travel springs, it will be necessary to decrease the depth of the present body bolster. When using proprietary designs of side frames having 28¾-in. height with long-travel springs, the present A.A.R. bolster design may be used without fear of interference.

Side Frames and Bolsters

During the year since the last report approvals have been granted to 228 additional designs of side frames and 226 additional designs of bolsters for use in interchange service. The joint subcommittee calls attention to the fact that 505 designs of side frames and 523 designs of bolsters have now been approved for interchange service. Duplication results from the assignment of separate numbers to similar designs when submitted by two or more manufacturers but, with allowance for this, the subcommittee believes the number is larger than necessary. The railroads are reminded that standardization to the greatest practicable extent will effect savings for all concerned. This is not to discourage improvements in design but to discourage perpetuation of old unapproved designs for which improved substitutes are available.

SELECTED ITEMS FROM PRELIMINARY SUMMARY REPORT OF 1948 CO-OPERATIVE FREIGHT-TRUCK AND SNUBBER RESEARCH PROGRAM ACCOMPANYING THE REPORT OF THE CAR CONSTRUCTION COMMITTEE

(Road tests conducted on Illinois Central with A.S.F. five-car service laboratory)

	Truck spring arrangement		Rail load 169,000 lb.			Rail load 60,000 lb.			Rail load 145,000 lb.		
				Lading damage index			Lading damage index			Lading damage index	
	Travel, in.	Snubber friction members	Avg. speed, m.p.h.[1]	Vertical	Lateral	Avg. speed, m.p.h.[1]	Vertical	Lateral	Avg. speed, m.p.h.[1]	Vertical	Lateral
Conventional Spring-Plankless Double-Truss truck with A.A.R. All-Coil Springs without Snubbers											
A.S.F. A-3 Ride Control[2]	2½	Worn in	41.2	5,285	3,950	45.9	6,388	2,770	62.7	24,678	12,469
A.S.F. A-3 Ride Control[2]	...	.....	.....	.....	.....	61.0	38,661	12,287	.....	.....	.....
A.R.A. all-coil:											
1936	1⅝	None	42.3	71,647	18,350	42.4	30,275	2,576	.....	.....	.....
1936 (Retest)	1⅝	None	41.0	71,672	11,926	.....	.....	.....	.....	.....	.....
1915	1 11/16	None	41.8	96,150	7,894	41.1	44,029	4,139	.....	.....	.....
1948	2½	None	43.1	64,447	5,980	41.9	53,346	4,212	.....	.....	.....
1915–1936 (Combination)	...	None	42.4	98,617	5,650	39.2	34,903	2,903	.....	.....	.....
1936 (Retest)[3]	1⅝	None	45.2	79,380	5,470	43.1	38,764	3,805	.....	.....	.....
Conventional Spring-Plankless Double-Truss with A.A.R. 1936 Coil-Spring-Unit Snubber Combinations per Manufacturer's Recommendation											
A.S.F. Simplex Unit	1⅝	Brk. in	42.1	11,930	2,447	42.6	10,879	1,931	.....	.....	.....
A.S.F. Simplex Unit	1⅝	Cond. lim.	43.4	16,880	1,681	39.9	16,490	2,613	.....	.....	.....
Sun Oil Co. Type T-2-D	...	Brk. in	41.4	49,122	1,707	Speed restricted to 50 m.p.h.; snubber withdrawn from test			.....	.....	.....
Symington-Gould Type SBS	1⅝	Brk. in	44.2	38,185	3,742	43.9	11,051	2,288	.....	.....	.....
Symington-Gould Type SBS	1⅝	Worn in	43.3	41,789	3,313	42.3	17,085	2,784	.....	.....	.....
Cardwell-West. Type A	1⅝	Brk. in	44.4	22,696	4,559	46.4	14,850	3,441	.....	.....	.....
Cardwell-West. Type A	1⅝	Cond. lim.	46.0	21,916	3,970	45.9	16,416	2,004	.....	.....	.....
Miner Type C-18 Unit	1⅝	New	42.9	47,029	4,122	44.7	11,460	5,323	.....	.....	.....
Miner Type C-18 Unit	1⅝	Cond. lim.	46.2	42,095	4,583	Mfgrs. elected not to run					
Frost Type 360	1⅝	Brk. in	43.2	54,762	6,916	44.4	32,313	5,944	.....	.....	.....
Holland Style A-7 Volute Snubber Springs	1⅝	New	41.8	39,259	5,927	41.6	29,917	4,086	.....	.....	.....
Holland Style A-7 Volute Snubber Springs	1⅝	Cond. lim.	41.2	41,886	4,746	43.6	46,259	6,902	.....	.....	.....
Conventional Spring-Plankless Double-Truss Truck with Package Group Snubbers on Long-Travel Spring-Snubber Combinations											
A.S.F. Package Group	3⅛	Brk. in	43.4	2,756	1,362	61.0	39,219	10,698	60.1	13,139	8,166
A.S.F. Package Group	3⅛	Cond. lim.	42.8	2,938	1,873	61.0	34,155	7,309	56.0	9,936	8,573
Ry. Truck Corp. Snub-Up Package Group	2½	Brk. in	43.2	7,546	6,953	57.9[4]	75,571	8,846	60.0[4]	26,862	11,168
Ry. Truck Corp. Snub-Up Package Group	2½	Cond. lim.	42.6	11,813	6,183	63.2[4]	77,832	7,880	58.0[4]	22,762	13,864
Cardwell-West. Stabilizing Package	3⅛	New	38.1	14,052	1,228	Mechanical failure of package snubber necessitated termination of road trip					
Cardwell-West. Retest Stabilizing Package	3⅛	New	41.6	13,745	1,794	Mechanical failure of package snubber necessitated withdrawal of device from test program					
Holland C-200 Volute Package Group	2¾	New	43.6	9,204	3,697	60.2[4]	64,677	8,094	62.6	36,095	12,097
Holland C-200 Volute Package Group	2¾	Cond. lim.	45.1	15,544	3,061	50.0[4]	66,945	5,884	50.0[4]	30,464	11,524
Special Designs of High-Speed Trucks with Long-Travel Springs and Built-In Snubbing Devices											
A.S.F. A-3 Ride Control	3 11/16	Brk. in	42.0	1,637	1,086	65.2	28,185	3,183	54.0	6,665	2,076
A.S.F. A-3 Ride Control[5]	3 11/16	Brk. in	.....	.....	.....	.....	.....	.....	56.5	7,810	2,628
A.S.F. A-3 Ride Control	3⅛	Brk. in	43.3	2,658	1,907	61.2	31,277	11,982	59.1	17,393	5,167
Nat'l Mall. & Steel Castings Type C-1	4	New	43.3	2,057	883	61.0	29,808	5,022	56.3	13,218	2,957
Penn. CL2D-F28-B frt. truck	3 11/16	New	43.6	1,273	455	62.6	27,954	6,902	65.9	14,670	1,665
Buckeye Steel Castings Co. Cushion Ride	4⅛	New	45.0	3,081	1,299	64.1	23,536	6,639	63.3	17,122	2,745
Scullin Steel Co. L-V Frt. Truck	3 11/16	New	42.3	1,548	6,375	66.7	51,528	6,311	60.7	4,952	11,565
Barber Stabilized, Type S-2 Frt. Truck	3 11/16	New	43.1	3,183	764	62.6	23,971	8,540	62.7	13,973	5,494
Cardwell-West. Stabilizing Truck	3⅛	New	46.1	20,797	9,993	62.1[4]	72,557	10,570	62.1	43,004	10,829

[1] These were the "yardstick" trucks under one of the two test cars and were not changed out during the 1948 tests. Values are recorded for each test. The values shown are approximately median.

[2] Maximum speed for all tests with 169,000-lb. rail loads was 65 m.p.h.; for the long-travel spring combinations and the special designs of high-speed trucks. The speed limit was raised to 90 m.p.h. for rail loads of 145,000 lb. Maximum speed with 60,000-lb. rail load for these two groups was also 90 m.p.h.

[3] Last test run of 1948 road test program as check for mechanical condition of truck (wheels, etc.) and road bed against initial runs.

[4] Reduced speed account adjudged unsafe.

[5] Retest because of slow order affecting speed of preceding test.

The manufacturers are advised that, while a backlog of approval tests still exists, this is now due to delay in supplying specimens for test. Both dynamic fatigue testing machines have been idle for substantial periods recently. Manufacturers are advised to file applications and schedule tests in advance of their requirements, then furnish specimens promptly, and thus avoid costly delays.

Helical-Spring Service Tests

Service-life tests of helical springs of various deflections from 1⅝ in. to 2½ in. are being followed closely by the subcommittee. The springs being tested and the test designations are:

A.A.R. 1936 springs, 1⅝-in. travel	T-1
Proposed 1944 springs, 1⅝-in. travel	T-2
2-in. travel springs	T-3
2½-in. travel springs	T-4

Tests had run about 38 months at the end of March, 1949. Failures during the first 26 months and after 38 months and a comparative index of failures of outer coils, based on those in test T-1 as unity in relation to the relative number of coils in service, are shown in the table.

In August, 1948, five of the 10 cars equipped with Class T-4 springs were fitted with Symington-Gould FLS snubbers. From September 1, 1948, to April 1, 1949, two outer coils failed on one car. On the remaining five cars equipped with Holland Type E snubbers, five outer coils failed, one on each of five cars. No definite conclusions or recommendations will be formulated until the test has progressed further or has been terminated.

PROGRESS OF HELICAL-SPRINGS SERVICE TESTS

Springs	—No. of failures— First 26 months	38 months to Apr. 1, '49	No. outer coils in service	Index 38 months
T-1				
Outer	8	31	1,600	1.0
Inner	1	3	....	...
T-2				
Outer	33	111	1,600	3.57
Inner	1	2	....	...
T-3				
Outer	64	181	2,000	4.66
Inner	7	8	....	...
T-4				
Outer	3	26	160	8.375
Inner	0	5	....	...

Design of Journal-Bearing Wedge

A joint subcommittee representing the Committee on Car Construction and the Committee on Lubrication of Cars and Locomotives agrees that the existing tolerances for journal-bearing wedges are as close as can be expected on "as cast" or "as forged" surfaces. It recommends, however, that changes to clarify the wedge and gauge drawings be submitted to letter ballot. These changes are an increase of 1/32-in. in dimension D (the width allowance for the top of the brass) for the 4¼-in. by 8-in. size, to provide clearance between a maximum bearing and a minimum wedge; a reduction of 1/16 in. in the depth of the sides of the wedge below the brass bearing face, to preclude the possibility of the bottom of the wedge coming in contact with the top of the side lugs on the brass when applying second-hand bearings; clarification of tolerances in the length of wedges of all bearing sizes; and designation of the faces of the wedge which must be smooth, true, and square. Changes to conform are also proposed in the journal-wedge gauges and in the journal-bearing wedge condemning gauges.

Journal-Box Lid Face and Lugs

Manual page D-15A, adopted in 1948 as recommended practice, covers journal-box hinge lug and pin-hole bushings for integral journal boxes. The committee now proposes, for letter-ballot action, that this page be revised to include separable journal boxes as well, to eliminate sizes A and B, and to add size G for separable journal boxes.

Proposed No. 18 Brake Beam

Brake-beam failures due to tension rods breaking in the threads at the base of the units cause serious delays and expensive derailments. The subcommittee is of the unanimous opinion that a new brake beam free from the inherent weaknesses of the present A.A.R. Nos. 15 and 3 beams should be developed. The mechanical committee of the brake-beam manufacturers has designed seven new types of brake beams. Two are the Unit type and five require standard brake-beam hangers.

Arrangements have been made for road and laboratory tests of the seven new designs in comparison with the A.A.R. No. 3 beam, which is stronger than the No. 15. Road tests are under way on a total of 336 brake beams. Later, an eighth design, a one-piece cast-steel brake beam of the Unit type, was included in the road-service tests. Laboratory tests were made at the American Steel Foundries' laboratory at Granite City, Ill., of 11 brake-beam designs, including the A.A.R. standard No. 3 and a No. 3 with Whitworth threads, and four Unit type beams.

Based on the data from road and laboratory tests so far secured, the subcommittee proposes the following:

(1) That standard A.A.R. No. 15 and A.A.R. No. 3 brake beams be superseded by a new beam known as No. 18, and that beams of not less capacity be mandatory for new and rebuilt cars and for new beams applied to existing cars.

(2) That the standard brake-beam specifications be revised and Appendices A and B be added to them: Appendix A to cover instructions for securing approval and certification of brake beams, which would constitute A.A.R. standard brake beams and would not be shown in the Manual; Appendix B to show the form of the certificate of approval.

These two propositions, together with the revised gauge drawings for the Manual to conform, are offered for adoption by letter ballot.

Five beams already tested meet the revised brake-beam specifications and would be granted certificates of approval and constitute new A.A.R. standard brake beams. Two of these are hanger type beams and three Unit type beams. Drawings of these are shown.

Brake-Beam Repair Specifications

Proposed changes in the Specifications for Repairs to Freight Equipment Brake Beams for submission to letter ballot would:

(1) Eliminate the requirement that compression members must be straightened cold. Experience has demonstrated that no difficulty is experienced with those which have been hot straightened.

(2) Require tension-rod nuts to be new U.S.S. standard or A.S.A. Class 2 heavy hexagon type, to provide more bearing surface between the face of the nut and the surface of the brake head.

(3) Make riveting of the ends of the tension rod mandatory. In a number of instances lock nuts have worked off the rod.

(4) Change specifications to conform to elimination of gauges for camber of brake beam from page B-12 F. The gauge shown on page B-8 provides the desired camber.

(5) Revise the method of lengthening brake-beam compression members shown on Manual page E-117 because the present arrangement interferes with the application of sleeve-type heads.

(6) Revise and transfer Manual pages showing the No. 15 brake beam and its parts to the Specifications for Repairs to Freight Equipment Brake Beams on new Manual pages.

(7) Eliminate tolerances from the dimensions of the "Go" and "No-go" parts of the strut pin-hole gauge shown on Manual page B-12-A, because, with the tolerance shown,

the go-gauge would not enter a 1⅛-in. hole. The "No-go" gauge is modified to harmonize.

Brake Pins

Pins of 1$^{7}/_{32}$ in. diameter are considered necessary where the bottom rod extends through the bolster, in order to keep the shear stress below 10,000 lb. per sq. in. based on 80-lb. cylinder pressure. It is proposed for letter ballot that this diameter be added to the present 1$^{3}/_{32}$-in. on Manual page E11.

Coupler-Striking-Casting Spacing

The question as to whether there should be a minimum spacing between the top of the coupler shank and the bottom of the striking casting, to accompany the maximum vertical spacing of ⅞ in. adopted in 1948, was considered by a joint subcommittee on which were representatives of the Committees on Couplers and Draft Gears and Arbitration. It is proposed for letter-ballot action that a minimum of ¼ in. be added to Item 19, Manual page C-4.

Marking Freight Cars with Roller Bearings

In order to protect freight cars equipped with roller bearings in hump-yard switching service, it is proposed for letter-ballot action that Section L of the Manual be amended to provide for the use of the suffix letter "R" after the car number on both sides and ends of the car, of the same size as the numerals.

Revision of Lightweight Striking Casting

Because patterns were not available during the war, the reduced-weight design of striker adopted in 1941 was not placed in service until 1946. In 1948 a few failures were reported in the integral carrier portion of the casting. Manufacturers' opinion is that the carrier part of the casting should be reinforced. It is proposed to return that part of the casting to the 1932 design, for letter-ballot action.

Welding

It is proposed for letter ballot that Section B—Welding Limitations, of Section L of the Manual include provision for reclamation by fusion welding and machining to dimensions of journal-bearing wedges.

Because of objections registered by a number of railroads at the expense involved if cracks and fractures in metal running boards cannot be repaired by welding, the General Committee held in abeyance the prohibition against welding adopted by letter ballot last year and the question is being restudied.

The committee does not agree with the suggestion that the restriction on building up worn surfaces of cast-steel bolsters by welding to those castings in which the material remaining is equal to 60 per cent or more of the original section, be removed, because it believes that cases beyond the present limit usually involve old castings which have completed ordinary life service.

Coupler Draft Keys

The recommendation that the wearing edge of draft keys be flame-hardened to increase service life is disapproved because the internal stresses introduced are likely to cause hazardous failures in service.

Other Items

Two items involve editorial clarification without change in intent. The welding of high-tensile-steel truck side frames, bolsters, couplers and parts, coupler yokes, etc., is under joint consideration of the committees involved.

Designating Letters for Cars

The Symbol "MBD" is assigned to combination mail, baggage, and dormitory cars.

A number of changes in definitions of symbols for various types of house cars to clarify confusion were also proposed.

A new symbol "XML" for loader-equipped house cars for stowing automobile parts and adaptable to other commodity loading was added.

A new symbol, "LOC," for covered hopper cars to be used in carrying carbon black is recommended, the nature of this material being such that it is not practicable to clean the car for carrying other commodities. The term "weed burner" has been broadened to "weed exterminator" to include chemical-spray methods of destruction as well as burning as shown in General Service Maintenance-of-Way Equipment Cars.

These proposals are submitted for letter-ballot action.

Damage by Shake-Out Devices

The probability of damage to car-body structure of steel hopper cars of all-welded construction is relatively high from the use of the Robbins shake-out device as at present built and operated. The damage to cars of all-riveted construction appears to be of considerably less magnitude. The subcommittee proposes to investigate possible changes of design and methods of operation of the Robbins device and to investigate the operation of Link-Belt and Ross & White devices.

The committee members are L. H. Kueck (chairman), assistant chief mechanical officer, M. P.; J. A. Gower (vice-chairman), assistant mechanical engineer, Penn.; R. B. Winship, mechanical engineer, C. P.; J. McMullen, consulting engineer, Erie; R. D. Bryan, mechanical assistant, A. T. & S. F.; R. H. Graff, assistant engineer, car equipment, N. Y. C.; W. A. Pownall, assistant to general superintendent motive power, Wabash; F. J. Herter, engineer car construction, C. & O.; J. K. Peters, mechanical engineer, D. & R. G. W.; H. L. Holland, assistant mechanical engineer, B. & O.; L. R. Schuster, engineer car construction, S. P.; M. C. Haber, general mechanical engineer, U. P.; F. G. Moody, superintendent car department, N. P.; and K. H. Carpenter, superintendent car department, D. L. & W.

Discussion

In a written discussion C. H. Green, engineer car design, Illinois Central, referred to the lack of orders for standard cars of the gondola, flat, ballast, stock, refrigerator, and special types reported by the committee, and called attention to Part I of the Supplement to the Manual showing drawings for a stock car with center sills and other details of old A.A.R. design which do not agree with the standard and alternate standard cars shown in Part II. He suggests that these items be revised or eliminated, or an explanatory page added describing the intent of the two parts of the Manual.

With respect to the variations from conventional freight designs, records of which are filed with the secretary, he asks whether each succeeding order of cars for which there are no A.A.R. standard drawings require filing of prints and specifications.

Mr. Green calls attention to the shifting of hopper-car bodies on the center sills, a condition which has been remedied by replacing ⅞-in. rivets as shown in the Manual with ¾-in. rivets in the connection of longitudinal hood and the inside hopper sheets to the center sill.

Referring to the condition of car floors, he said that the Illinois Central had found that by increasing the deck from 1¾ in. to 2½ in., the decking would be stronger than if an additional stringer had been installed as recommended by the circular letter issued by the Mechanical Division on April 15, 1949, and at a cost less than that of the installation of the stringer. Furthermore, the benefits would be gained over the entire floor area.

J. L. Ryan, mechanical engineer, St. Louis-San Francisco, in a written discussion referred to the criticism leveled at the industry during the 1948 annual meeting because of its lack of progress in freight-car design, particularly freight-car trucks. While side frames and bolsters, to the casual observer, are the same now as 20 years ago, he said, the specifications

to which they are built and tested are quite different. Furthermore, the vertical lading damage index of the special designs of high-speed trucks with long-travel springs and built-in. snubbing devices, presented in the preliminary report of the 1948 co-operative freight-truck and snubber research program, was only 2½ to 3 per cent compared with that for the A.A.R. trucks typical of 20 years ago. Furthermore, he said that the vertical lading damage index of all except one of the high-speed trucks at a loading of 145,000 lb. operating up to a maximum speed of 90 m.p.h. and averaging approximately 60 m.p.h. was only 10 to 20 per cent of that of the A.A.R. standard trucks loaded to axle limit and operating at maximum speeds of 65 m.p.h. and averaging 42 m.p.h.

With respect to the new brake beams already tested and found to meet the new specification requirements, Mr. Ryan said that the railroads would have to give particular attention to providing applications the reliability of which would be comparable with that of the beams if full benefit of this improvement in the beams is to be realized.

Mr. Ryan felt that with present labor costs the use of vibratory shake-out devices for unloading hopper cars will be greatly increased. He referred to fleets of cars now in service, to many of which recent large additions have been made, which are largely of A.A.R. 1934 design. He believes that tests subjecting this design to 1949 conditions and developing corrections for weaknesses that may come to light would be a project that could well pay dividends in lower maintenance. He suggested a study of all-welded cars tested with the Robbins shake-out device to determine age, thickness of sheets, type of steel, and their relation to builders' most recent developments.

E. P. Moses, engineer of rolling stock, New York Central, said that this road had several failures with the I-beam bolsters recommended in the report, and thought the matter should be investigated further. The chairman of the committee replied that this was the first such case that had come to the committee's attention.

R. B. Cottrell, chief mechanical engineer, American Steel Foundries, recommended that roads which have to renew old designs of side frames give consideration to replacing the entire truck with a suitable later design on some of the cars and using parts from such replaced trucks for repairs to other cars in the series.

(The report was accepted and recommendations submitted to letter ballot.)

Locomotive Construction

Several subjects on which reports are made by the Committee on Locomotive Construction apply to more than one kind of motive power. These are, therefore, presented in a "General" section separate from the three sections devoted to steam, Diesel and gas-turbine locomotives. The report on each subject is the work of a subcommittee.

General

Marking Diesel Wheels

Because the number of wrought-steel wheels on Diesel locomotives reported failing through cracks originating in the identification stamping on the back of the rim has been increasing, a revision in marking requirements of these wheels was authorized by the General Committee and presented to the members in a circular letter dated March 7, 1949.

Driver and Trailer Tires

To clarify the information as to the contour of driving and trailer tires in the Manual, the drawing showing "Section of Tire" (Manual, page F-7 and Locomotive Tire Manual, page 27) is to be changed to drop the location of the taping line and to show optional lip and groove on the inside diameter of the tire.

MILEAGE COMPARISONS OF LOCOMOTIVES WITH ROLLER BEARINGS AND FRICTION BEARINGS

Road	Loco. type and service	No. locos. in class with roller brgs. on driv. axles	Roller-brgs. on driving axles	Mileage between mach. shoppings, roller-brg. locos. per cent of friction-brg. locos. of same class
A	4-6-2 pass.	24	All	150
A	4-6-2 pass.	5	All	177
B	4-6-2 pass.	4	All	140
B	4-6-4 pass.	5	All	180
B	2-8-2 frt.	42	Main	170
B	2-8-2 frt.	29	Main	150
D	2-8-2 frt.	34	All	157
B	2-8-4 frt.	12	Main	117
A	4-8-2 pass.	26	All	177
B	4-8-2 frt.	28	Main	129
D	4-8-2 pass.	18	All	145
C	4-8-4 frt.-pass.	23	All	140
D	4-8-4 frt.	65	All	120
A	2-10-2 frt.	10	All	168
B	2-10-2 frt.	73	Main	207
D	2-10-2 frt.	1	All	167
B	2-10-4 frt.	5	Main and No. 4	139

Roller-Bearing Performance

To procure up-to-date performance data of roller bearings on steam-locomotive driving axles as compared with friction bearings, a questionnaire was submitted to a selected group of railroads having roller-bearing locomotives which were formerly equipped with friction bearings. Questions covered the effect on mileage between shoppings for machinery repairs, the mileage life of main driving axles equipped with roller bearings, and the practice of the roads with respect to the use of stress-relief grooves. Data on tender-axle performance was also developed. The performance comparisons in the table are from railroads having in service locomotives of the same classes with both friction and roller bearings.

Three styles of stress-relief grooves are illustrated in the report and mileage limits reported for main axles with grooves varied from 200,000 to 700,000. Some roads have established no mileage limits, but depend upon pressing axles part way out of the wheels at shoppings and testing with magnetic particles.

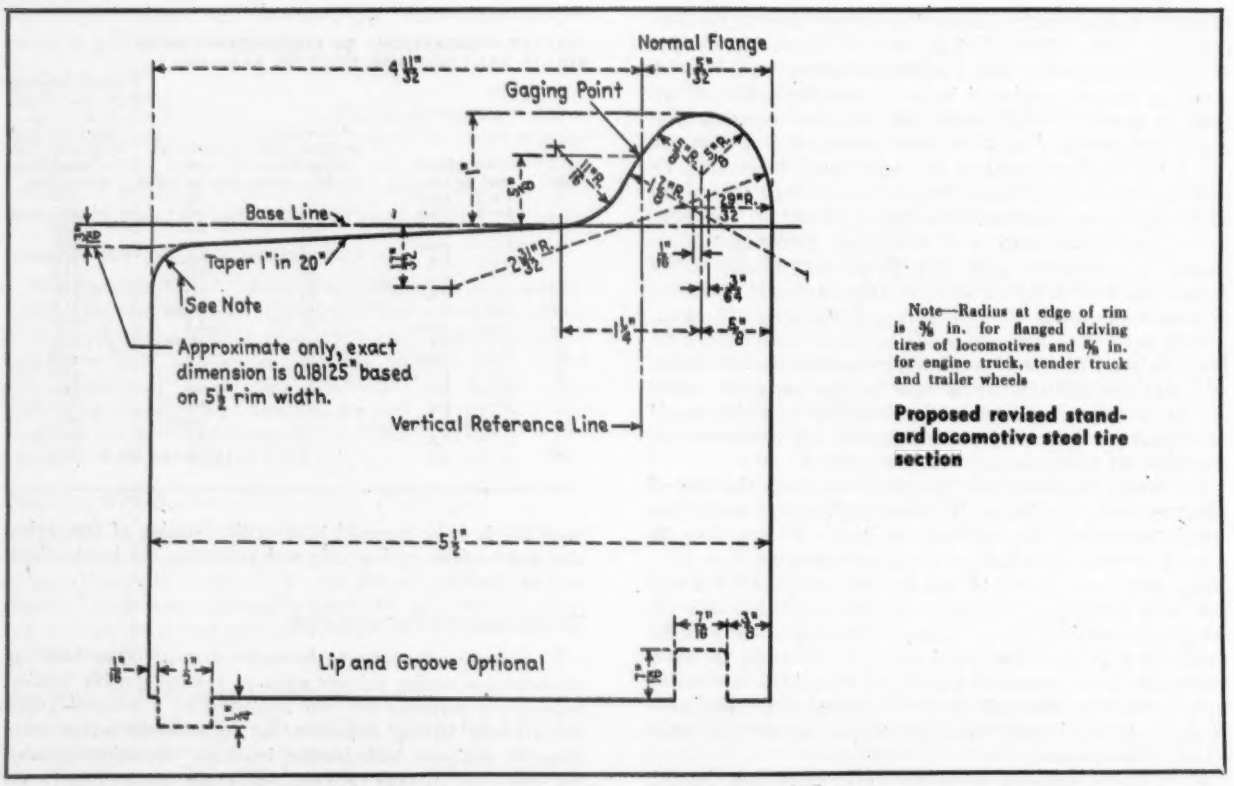
The relief grooves vary in detail dimensions. Radii vary from 1 in. to 1½ in. and depth of groove from 9/16 in. to 7/16 in. The wheel face in some cases is flush with the edge of the groove; in others, it overlaps the groove in amounts varying up to one-half the width of the groove.

In the 1947 report of this committee a performance average of 864,147 miles per locomotive failure chargeable to tender-axle roller bearings was recorded. Reports from seven roads vary from 1,538,000 miles per hot bearing on 396 tenders equipped with roller bearings to 26,000,000 miles per hot bearing with 91 tenders equipped. One road reported no hot bearings on six classes numbering 102 tenders equipped and one hot bearing on each of two classes with a total of 13 tenders equipped.

Diesel Truck Pedestal Openings

Since 1940 the committee has been engaged in the development of standards for locomotive pedestal openings for roller-bearing boxes. The subject embraced all types of motive power and tenders. A mass of information on steam motive power was collected, but is not now considered to be of sufficient interest to warrant publication.

The committee prepared two sheets on which are shown comparisons of pedestal-opening dimensions of various types of Diesel locomotives with the standards proposed by the committee. Six standards are proposed. Three are based on the 5-in. by 9-in., the 5½-in. by 10-in., and the 6-in. by 11-in.



Note—Radius at edge of rim is ⅜ in. for flanged driving tires of locomotives and ⅝ in. for engine truck, tender truck and trailer wheels

Proposed revised standard locomotive steel tire section

A. A. R. standard journal boxes, respectively. They differ from these principally in a considerable increase in the total height of the pedestal openings, and smaller changes in the width of opening and width and height of pedestal liner faces. These conform to Whitcomb locomotive boxes, except that the pedestal faces are wider.

The 1947 recommended-practice pedestal has an 11⅛-in. opening and is standard on a number of switching and road switching locomotives of all of the builders except Alco. The trucks on one Baldwin 1,500-hp. road switcher and one 2,000-hp. transfer locomotive can be made to conform by increasing the width of the pedestal liner faces.

The two remaining proposals, designated A, and B, have 15$\frac{1}{16}$-in. pedestal openings. Proposed A is standard on Baldwin 1,000-hp. road switchers and 1,500-hp. freight locomotives. Trucks of Alco 1,000-hp. road switchers require increased width of pedestal faces, shorter pedestal liners and shorter axles to conform. All Electro-Motive Division 1,500-hp. models require a revised box or a shorter axle to conform.

Trucks of Alco 1,500-hp. road switch and freight locomotives can be made to conform to Proposal B by reducing the width of the frame jaw and increasing the length of the pedestal liners, and the Alco and Baldwin 2,000-hp. passenger units require only shortening the pedestal liners. Replacement of vulcanized-rubber sandwich liners on the pedestal faces of Fairbanks-Morse 2,000-hp. passenger locomotive with thinner steel liners brings them into line. The Electro-Motive Division 2,000-hp. passenger locomotive requires an increase in the axle length as well as wider pedestal liners.

The changes which would have the greatest effect on existing replacement stocks are the axle length and box dimensions of the Electro-Motive Division road units.

The committee asks member roads to review the report and make comments, criticisms, or suggestions.

Steam Locomotives

Additional Material Specifications

To complete the work on specification references for material on design drawings, the committee points out that there are no suitable A. A. R. specifications to cover material for injector screw coupling sleeves and nuts, lubricator fittings, copper tubing, and copper flue ferrules. The Committee on Specifications for Materials has questioned the necessity for such specifications. After again considering the subject, the Committee on Locomotive Construction is unanimously of the opinion that the four additional material specifications are desirable and again refers the matter to the Committee on Specifications for Materials.

Lubricator Oil-Line Fittings

After a canvass of 32 selected member roads as to the desirability of standardizing mechanical lubricator oil-line fittings, it is the opinion of the committee that, "In view of the reduced inventory of steam locomotives and the declining market for new lubricators, any standardization of oil-line fittings would, in general, if adopted, result in increased expense to both the railroads and the lubricator manufacturers which, in most instances, could not be offset by any savings which might result.

Hand-Rail Columns

In 1925 nine designs of hand-rail columns which provided for ready removal of the hand rail were submitted as information. These designs have been reviewed and a drawing showing nine styles accompanies the report. Four are of those submitted in 1925; three are later designs. Two provide for supporting an independent conduit for electric wiring. Eight of the designs are recommended for adoption as Recommended Practice and the other as an acceptable alternate design.

Fusion-Welded Boilers

There is no change in the number of complete boilers built by the fusion-welding process since the last report of the committee. The first fusion-welded boiler was built for the Delaware & Hudson in 1937 and since that time 25 complete boilers have been built and six more are on order. The New York Central has had 24 welded shells built for

4-8-4 type locomotives and has 20 on order for 4-6-4 type locomotives.

To clarify misunderstanding as to how repairs are to be made to boilers of welded construction, the report sets forth a specification as to welding, stress-relieving, removing and rewelding pin holes, cracks or other defects, and testing.

Seal-Welding of Staybolts

Of the 91 member roads owning 32,795 steam locomotives replying to a questionnaire, 23, or 25 per cent, equip locomotives with seal-welded staybolts. This practice is standard on seven of the 23 roads and undergoing tests on the other 16.

There are two methods most generally used when applying staybolts that are to be seal welded. Of the 23 roads which seal weld staybolts, 12 drive staybolts in the inside sheet and snap to the desired diameter for seal welding; five roads mill extension of staybolts through the inside sheet with cutter for desired projection and diameter for seal welding and four roads follow both methods.

One road uses the following method: When threads are cut on bolt machine, a radius is cut on the end of bolt, which cuts away about two threads. The bolts are screwed in from the outside to within about 1 in. of inside sheet, after which each staybolt hole, along with the ends of the bolts are thoroughly steamed to eliminate any oil present, due to tapping. The bolts are then screwed into place, driven on both ends and seal welded on the firebox side.

Another road uses the following method: End of bolts are scarfed to a 30-deg. angle before threading. Bolts are applied from outside and adjusted to extend $\frac{3}{16}$ in. through inside sheet. Bolts are then driven first from outside backed up with heavy dolly bar and finish driven from inside with die without rocking, to make a flat head $\frac{3}{32}$ in. above sheet and then seal welded on the inside.

The seven roads on which the practice is standard indicate an increase in the life of firebox sheets ranging from 50 per cent to 100 per cent.

Counterbalancing

No new steam locomotives have been built or existing locomotives rebuilt with lightweight reciprocating parts since the last report of the committee. The committee is of the unanimous opinion that no further counterbalance tests of steam locomotives are necessary and recommends that the subject be closed.

Diesel-Electric Locomotives

Diesel Truck Parts

Details of the component parts for the interchangeable truck for 600-hp. and 1,000-hp. Diesel-electric switching locomotives adopted as Recommended Practice in 1947 are presented by the committee in a supplement of 20 drawings. The committee proposes these for adoption by letter ballot as Recommended Practice.

Brake Shoes for Diesel Road Locomotives

Two styles of compromise-radius brake shoes for Diesel-electric road locomotives with 36-in. to 42-in. wheels were presented in the 1948 report for the purpose of simplifying stocks. These were 18-in. and 20-in. back radius and both had the same face radius. The 20-in. back radius is preferred and should result in less scrap when worn out. It is proposed that this shoe, a drawing of which is included in the report, be adopted by letter ballot as Recommended Practice.

Type Designation of Locomotives Other than Steam

Pages F-103 and 104 of the Manual of Standard and Recommended Practices show a standard practice for designating axle arrangements for electric locomotives and internal-combustion locomotives having electric transmission adopted in 1932. In the 1948 report to the members the committee undertook to clarify the practice so that it can be more uniformly applied and, if possible, include some identification of the service in which the locomotive is used.

It is the opinion of the Locomotive Construction Committee that any attempt to include description beyond a statement of the axle arrangement would be unduly complicated. Consequently, it is proposed at this time to revise only the present standard practice to bring it more up to date and to clarify the application by means of diagrams. No extensive revision is necessary except that a somewhat altered interpretation of the description of multiple-unit locomotives is introduced in that the wheel arrangement of units permanently connected by drawbars are set up as complete locomotives, similar to the practice in steam locomotives. For example, an articulated locomotive is set up in the Whyte system as a 4-6-6-4 and, similarly, with two units each with two four-wheel swivel trucks is set up as (B-B) + (B-B). Where the units are the same but readily separated, the classification would be 2 (B-B), as shown in diagrams.

It is recommended that the proposed revisions of the standard nomenclature for designating wheel arrangements for locomotives with electric transmission be submitted for adoption by letter ballot.

Diesel Fire Protection

The Fire Protection and Insurance Section has now made a survey of 54 railroads, representing the majority of owners of Diesel locomotives, to determine present practices as to fire protective equipment. At this time, the returns have not been fully analyzed. However, a preliminary check discloses that there is still a rather wide difference of opinion as to the amount of protection required. The choice of quenching media has apparently narrowed to carbon dioxide and dry powder although some of the railroads reporting still use carbon tetrachloride.

There has been some employment of foam for fire protection. One railroad reports using a 2½-gal. portable foam extinguisher in the engine room. This same road has installed a fixed foam system in passenger locomotives, consisting of a 75-gal. water tank and 100 ft. of hose. Normally air is used as a propulsion means, with a supply of nitrogen as an auxiliary. Another railroad is now installing foam equipment consisting of 125-gal. water tank, with a 25-lb. carbon-dioxide tank to propel the water, a 10-gal. proportioning tank containing the air foam liquid, with permanently installed piping to fire-equipment boxes under the locomotive, where 100 ft. of hose and foam-making nozzle are located on each side of the locomotive. Approximately 2,000 gallons of foam will be produced. This equipment is designed for use outside the locomotive only, as its use inside with the high voltage involved is obviously dangerous.

A new quenching medium, chloro-bromo-ethane, is now being studied. Its use is still in the experimental stages but reports indicate that it appears to be very effective. This development will be followed and further report made.

Attention is again directed to the danger of using carbon tetrachloride in engine rooms or other confined spaces and the Fire Protection Section is about ready to recommend the elimination of this type because of this feature. It is also stated that carbon tetrachloride is not too effective, and the extinguishing equipment is expensive to maintain.

The results of the survey summarized above will be published by the Fire Protection and Insurance Section and it is expected that revision of the original recommendation will be furnished to the committee for submission to the membership of the Mechanical Division.

Protection for fuel tanks has been briefly mentioned in previous reports. One of the builders is prepared to provide this protection by surrounding the fuel tank with the water tanks. The water and fuel tanks are separate and distinct tanks so that leakage between the two fluids will not be

possible. This arrangement is, of course, practicable only on new locomotives, or when complete replacements of fuel and water tanks are needed. For existing tanks a protecting shield has been recommended. An arrangement applied by one railroad, which reports that it effectively prevented puncture of fuel tanks, consists of a guard of netting of ¼-in. wire and 1-in. mesh spaced away from the tank by pressed-steel members.

The subject of cleanliness and housekeeping cannot be too strongly emphasized, the report said. Floors, tank tops, trucks and other equipment kept clean of oil and dirt promote both fire prevention and safety. There appears to be no easy way to successful fire prevention. Frequent checking and inspection of fire-preventive appliances is an absolute necessity to insure that the equipment will function when the need arises. Careless or slipshop inspection and maintenance of these appliances can easily and generally does lead to serious consequences. There can be no compromise in this matter.

Instruction in the use of fire fighting appliances is of extreme importance and should not be neglected. Any instructional set-up for the operation and maintenance of Diesel locomotives should include the items of use and maintenance of fire fighting appliances.

Gas-Turbine Locomotives

Coal-Burning Developments

The Locomotive Development Committee has made considerable progress in the development of the coal-fired gas turbine locomotive since the report of last year. Two gas-turbine power units for locomotive use remain on order, one from Allis-Chalmers and the other from the Elliot Company. It is anticipated that both power plants will be block-tested about September, 1949, using oil as fuel. Final acceptance will be contingent upon results obtained in these tests. Delivery of the two power units is expected in January, 1950.

Combustion research is being carried on at Battelle Memorial Institute, Columbus, Ohio, at the Alco Products Division, American Locomotive Company, Dunkirk, N. Y., and at Fontana, Cal., under the direction of the Turbodyne Corporation. The latter organization has completed its assigned work. Combustion efficiencies in the middle 90 per cent range have been achieved. The engineering development of the coal handling and pulverization equipment is being processed jointly by the Standard Stoker Company, Babcock & Wilcox Co., and the committee. Babcock & Wilcox are producing for the committee a type B-221 pulverizer which is an adaptation of its standard ball-mill design. This pulverizer may be operated either at gas-turbine pressure for direct injection of pulverized fuel to the combustors or at atmospheric pressure, in which case the pulverized coal is fed to the combustors by means of a coal pump. Further tests will be conducted to determine which method will be followed.

The problem of fly-ash removal has been proceeding toward a solution, in cooperation with several leading manufacturers of dust extraction equipment.

By the middle of October, 1949, it is expected a full-size, full-pressure gas-turbine power plant, complete with coal-handling, pulverizing and fly-ash-extraction equipment, will be in operation at Dunkirk Laboratory. This gas turbine is similar to the Allis-Chalmers unit, and has been loaned to the committee by the Bureau of Mines.

The American Locomotive Company and the Baldwin Locomotive Works are proceeding with the locomotive designs, based on two-unit, double-end construction, with two six-wheel trucks to each cab. The overall length of the two units is approximately 151 ft. 3 in. over the coupler knuckles. The nominal horsepower rating is 4,200. The estimated total weight of both units is 780,000 lb. The weight is distributed over 12 axles, eight of which are driving axles. The center axle in each truck is an idler axle. The estimated average weight per axle is 65,000 lb.

The estimated coal capacity of the locomotive is 18¼ tons, and water capacity 3,300 gallons. Two 3,000 lb. per hr. steam generators are indicated.

The design of the coal-burning gas turbine locomotive is kept abreast of the progress of gas-turbine construction, so there will be no unnecessary delay in building the two experimental locomotives after the gas turbines and their combustion equipment become available.

G. E. Gas Turbine-Electric Locomotive

Early in November, 1948, the first gas-turbine-electric locomotive to be built and operated in the United States began its track tests at the General Electric Company plant at Erie, Pa. This locomotive, an Alco-G. E. 4,500-hp. unit, has been undergoing tests at Erie during the winter, and recently completed successfully a group of test runs under load condition. It is planned to place this locomotive in operation on the Union Pacific this summer on a demonstration basis.*

Although the gas turbine is now fired by Bunker C oil, Alco-G. E. hope that special research efforts, coupled with experience gained from operation of this first locomotive design, may lead to the development of successful means of burning coal in the gas turbine locomotive. Alco-G. E. is cooperating with the Locomotive Development Committee of Bituminous Coal Research toward that end.

Westinghouse Gas-Turbine Locomotive

The Westinghouse 2,000-hp. gas-turbine unit, which has been on test since August 1, 1946, has been modified for gas-line booster service by the application of a centrifugal gas booster in place of the former railroad type d.c. generator. This modified unit will be used to pump natural gas into the pipe lines of the Mississippi River Fuel Corporation at Wilmar, Ark. This application will determine the life of the high temperature parts.

Two similar 2,000-hp. units will power a 4,000-hp. single-cab locomotive, which is now under construction. The estimated total weight of the locomotive is 225 tons, complete with all fuel supplies, and including train heating equipment. The locomotive is designed for passenger service, and is geared for 100 miles per hour maximum speed. The continuous tractive force is 52,800 lb. The overall length is 77 ft. 10 in. over coupler faces, the width is 10 ft. ¾ in. over the side sheets, and the height is 14 ft. 1 in. The weight is distributed over eight axles, all of which are drivers.

The complete locomotive is expected to be released for test during 1949 and will be available for demonstration thereafter.

A. T. & S. F. Gas-Turbine Locomotive

This locomotive, which is under construction at the Baldwin Locomotive Works, is a single cab, passenger type, with 4-8-8-4 wheel arrangement. It is 91 ft. 6 in. long, coupler to coupler, d.c. electric drive, is rated at 3,750 shaft hp. and is designed for 100 m.p.h.

The gas-turbine power plant, generator, and motors will be supplied by the Elliott Company. The turbine power plant consists of a two-stage, centrifugal compressor, a four-stage reaction turbine, a single combustion chamber, and a regenerator. Eight traction motors are provided.

Progress in the construction of the oil-fired gas turbine locomotive has been seriously retarded by unexpected difficulties experienced in the manufacture of the power plant and by priority accorded equipment for the U. S. Navy, which is being produced by the same manufacturer. The component parts of the power plant and transmission are now approximately 90 per cent complete, but an extensive program of tests are in prospect for this equipment before

* See page 383 of the July issue for a description of this locomotive.

it can be installed in the locomotive. Work on the trucks, underframe and superstructure was suspended sometime ago pending the successful solution of manufacturing problems which have arisen in connection with the power plant and the completion of the block tests which are to be run when the power plant has been finished.

It is expected that work on all parts of this locomotive will be resumed at an early date, and carried to completion with the least possible delay.

Lima-Hamilton Gas-Turbine Locomotive

Lima-Hamilton has under development and construction a gas-turbine locomotive, type 0-6-6-0. This locomotive is intended as a general purpose design, having 3,200 hp. available for traction in one unit. The locomotive will be equipped with two three-axle trucks, having electric traction motors on each axle. The total weight of the locomotive is approximately 360,000 lb. The average axle loading is 60,000 lb. The unit will be an A car and it is believed that most combinations will not exceed two units.

The Lima-Hamilton type of gas turbine embodies a free-piston Diesel type compressor combustor, which supplies the power gas to drive the gas turbine. The free-piston gas-turbine power plant has several outstanding technical characteristics which make it particularly suitable for railroad locomotive application. The air compressor in the free-piston gas generator is an integral part with the Diesel cylinder and in this design all of the air pumped by the Diesel combustion is used to scavenge and supercharge its own cylinder. In this way, the high efficiencies of the Diesel cycle are transferred to the gas turbine power plant since it is possible to do the work of driving the compressor under the direct thrust of the Diesel piston and utilizing the known characteristics of Diesel combustion. The combustion gases, while burned at a high temperature level as in any Diesel engine, are expanded down during the work of compression in the compressor cylinder, reaching a low temperature level at the time when the compressed air is delivered through the Diesel cylinder, mixing with the combustion gases which are piped to the gas turbine. This cycle avoids the necessity of burning fuels at high temperatures after the compressor—these combustion gases going directly through the gas turbine in the other types of construction which embodies rotating compressors.

The free-piston gas generator is a unit cylinder, which is not attached mechanically to any driven machinery. The gas-generator delivers its mixture of combustion gases and compressed air, and as many gas generators can be piped into the turbine as will be required to produce the necessary power for any given locomotive. In the Lima-Hamilton design, six gas generators are integrated with the gas turbine and the rotating electrical equipment.

This power plant delivers a high thermal efficiency. The term "free-piston gas generator" is descriptive of the fact that the pistons are free to move in their stroke without the restriction of any mechanical connection, tied to any mechanical part that delivers power to drive the locomotive. This means that the stroke of the machine is variable and under control.

In the event of any operating casualty to one or more cylinders, the overall power plant will continue to function on the remaining cylinders and by lengthening the stroke of the power piston, which is merely a matter of controls, the plant will deliver full load to the turbine until the locomotive can be serviced. Any units taken out of service are simply valved out of the turbine gas line and the overall power plant continues to function.

Another advantage of the free piston unit is its ready accessibility for shopping. Each individual unit can be removed simply by disconnecting pipes and holding bolts requiring very little time in the operation, and there is no mechanical shaft alinement or anything of that nature to be considered.

The members of the committee are H. H. Lanning (chairman), mechanical engineer (locomotive), A., T. & S. F.; *Steam and Electric Locomotive Section:* E. L. Bachman (vice-chairman), general superintendent motive power, Penn.; C. H. Knowlton, assistant engineer, equipment, N. Y. C.; Frank Williams, chief mechanical engineer, Can. Nat'l; D. R. Calleri, mechanical engineer, S. P.; J. L. Ryan, mechanical engineer, St. L.-S. F.; *Diesel Locomotive Section:* A. G. Hoppe (vice-chairman), general superintendent locomotive department, C., M., St. P. & P.; K. Cartwright, chief mechanical engineer, N. Y., N. H. & H.; G. W. Bohannon, chief mechanical officer, C. & N. W.; J. D. Loftis, chief motive power and equipment, A. C. L.; G. F. Wiles, supervisor Diesel-electric locomotive operation, B. & O.; *Gas-Turbine Locomotive Section:* H. C. Wyatt (vice-chairman), assistant general superintendent motive power, N. & W.; J. B. Blackburn, engineer motive power, Advisory Mechanical Committee, C. & O.; J. L. Carver, mechanical and research engineer, I. C.; H. Rees, mechanical engineer, U. P.

Discussion

F. R. Denney, assistant mechanical superintendent, T. & P., asked whether the Reflectoscope alters the outlook for roller bearings, or the design and application of stress-relief grooves, and J. L. Ryan, mechanical engineer, Frisco, said he would expect it to reduce costs, as axles do not have to be pressed out for inspection. E. D. Hall, engineer of tests, Erie, stated that the use of this device has permitted the Erie to discontinue remoxing axles on the basis of mileage. Cracks under the wheel seat that are discovered may result from the stress-relieving groove ($\frac{3}{16}$ in.) not being deep enough.

A member recommended putting to letter ballot the matter of standardization of parts between different makes of Diesel locomotives so that the builders will know that the roads want standardization.

One thing considered necessary for more effective use of Diesel fire-fighting equipment is knowing what the unit will do inside the locomotive when handled by railroad personnel. What an extinguisher can do under test conditions when handled by an expert cannot be considered its normal rating. One road simulated Diesel cab conditions by igniting oil-soaked waste inside old steam locomotive tenders.

V. C. Golden, superintendent of motive power and equipment, Monon, presented a written discussion on the Dieselization of the Monon, tracing the replacement of 97 obsolete steam locomotives by 57 Diesel units totaling 79,700 hp. In addition to detailed operating figures he mentioned that the 57 units, the oldest of which is 2½ years, have 7 different wheel assemblies, 7 different traction motors, 6 different generators, 5 different types of trucks and 3 different types of engines.

A builder's representative wondered just how much standardization the roads really want. In two recent orders, one road requested 57 changes, and another 42 changes. Out of these, only 7 coincided. Another example of individual preference is the seven designs of number plates currently in use.

J. P. King, mechanical and electrical engineer, G. M. & O.: The G. M. & O. has been operating Diesel equipments since about 1934. At that time the equipments on our lines were in passenger service only. About 1944 we began to take delivery on some freight units and put them in operation. We are now operating 16 passenger units, 31 standard switch units, 42 combination road units, and 122 freight units.

During the time that we were acquiring our freight units there was some consolidation of the lines that now make up the G. M. & O with the attendant necessity of consolidating and expanding maintenance facilities. This consolidating and expanding program has been going on for 2 years and at the present we have not completed it, however, we expect to have our maintenance facilities complete in the next several months. We expect to take delivery on some 15 additional units that are now on order and this will bring our total

Diesel-electric ownership up to 137. Our operation is divided into two regions, the Northern Region being that part north of St. Louis upon which our principal operation is between St. Louis, Mo., and Chicago. Our passenger equipment is maintained at St. Louis and our freight equipment at Venice, Ill. On the Southern Region our operation is between St. Louis and Mobile, Ala., and between Jackson, Tenn., and New Orleans. Our passenger equipments for the most part are maintained at St. Louis and our freight equipments at Jackson, with some light maintenance at Mobile and East St. Louis, Ill. The controlling factor of the operation of both the passenger and freight locomotives is the frequency of wheel changes, it being necessary to change wheels and sometimes an entire truck at from 75,000 to 100,000 miles. This mileage represents 4 to 5 months in passenger service and 10 to 12 months in freight service. Some of our wheels run short of this mileage because they develop thermal cracks. Thermal cracking of wheels has been a live subject with us and we have followed this vigorously and we believe we have improved our operation by the elimination of the flange-type brake shoe and by a strenuous campaign to educate our personnel to brake trains without the excessive use of the locomotive brakes. However, we are not entirely satisfied with the results and we are looking for the answer to this problem. We know that the subject is not a new one with you and possibly some of you will be able to contribute to the lessening of thermal cracks by giving the benefit of your experience and telling us what you have done to minimize short mileage and wheel failures from this cause. The wheel manufacturers have gone a long way to improve wheels and no doubt we can expect them to come through with a better wheel.

Electrical Problems

Our electrical problems do not appear to be as enormous as they were at one time for we learned a long time ago that in order to get the best that there is in any electrical apparatus that it must be kept clean. Further there must be some definite method of maintenance and it must be done with regularity. For instance you just can't let a motor or a generator brush run until it wears out. You have got to do something about it before it wears out and that something is usually to renew it with a brush of the proper type and properly fit the brush when it is renewed. Further than that during the running of the brush you must have your personnel on their toes to the extent that they will check the tension of the brush hammer springs and if they need adjusting, do it when they find that it is necessary. By giving the proper attention to the electrical equipment at the proper time and by maintaining cleanliness we seem to have gone a long way in improving our operation as well as cutting down our M. of E. cost. True we have an occasional failure of a traction motor and an occasional flash-over of a main generator but we have the satisfaction of knowing that when it does occur that it is not abject indifference on the part of maintainers but is usually due to some poor operation or an overload.

We are still not out of the woods on our traction motor problems, most of which seem to center around armature bearing lubrication. Some believe it should be done with oil. Others believe it should be done with grease. We have tried both. In fact we are now using both and it seems that we still get into trouble with both methods of lubrication. There is a tendency on the part of maintainers to overlubricate both types of bearings and when they do the result is that a film of oil or grease collects on the commutators and this results in a flash-over with attending damage to the motor. We have recently put into service a few motors that are packed with a certain type of grease and the lubricating holes in the caps blanked off. It will be interesting to find out what the results are. It is our understanding that other railroads are operating with this type of lubrication and it is our hope that this subject will be thoroughly discussed in this meeting so that we might get the benefit of the experience of others.

We still have some of the difficulties that existed on the first Diesel engines we operated. Among these difficulties is that of lubrication and the high cost of frequent renewal of filtering media for the lubricating oil. At one time in our operation it looked like that we were going to spend all of our earnings with the fuel filter manufacturers, but by diligent study of the condition we were able to develop in conjunction with the locomotive builders a better filtering cycle employing more metallic filtering screens which has now cut the use of the waste filter element considerably. We have increased the mileage on cotton-filter elements from what was at one time only 3,000 miles to over 12,000 miles at present. Further we seem to be getting better lubricating results.

We are still having some difficulty with cylinder heads on all the types of engines that we operate. Some of these difficulties we believe will finally be overcome by the development of a better type of gasket. We are making some progress in overcoming the difficulty we have in some types of engines due to the beating out of valves and valve seats. We believe finally that we shall develop a valve seat, or rather a combination of valve seat and valve, that will run many years without damage to either the seat or the valve. In fact we have in service one engine that has operated through a period of about 3½ years and when examined recently there was no sign of either the valve mushrooming or the seat beating out.

It is gratifying to us that we have made a considerable improvement in mileage between the renewal of superchargers and engine exhaust manifolds. The manufacturers have worked with us untiringly and to them goes most of the credit for improving this feature of the engine.

We find that all the types of locomotives we operate are improving daily because of the willingness of the manufacturer of the locomotive to cooperate with us to the fullest extent in making improvements in their product and assisting us in making improvements in our technique both in the operation and maintenance of equipments.

(The report was accepted and necessary recommendations ordered referred to letter ballot.)

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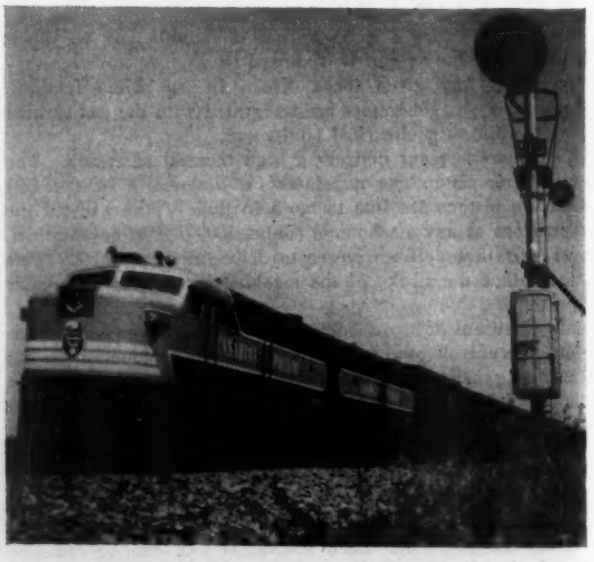


Canadian Pacific two-unit Diesel-electric locomotive No. 4000, the first of 23 units ordered for main line operation between Montreal, P. Q. and Wells River, Vt.

EDITORIALS

The Transit in Locomotive Layout

An unusually good example of the need and value of precision work in back shopping modern steam power was told us recently by a mechanical officer of a road operating a number of roller-bearing 4-6-4 passenger locomotives. One particular locomotive in the group was cutting tires badly on the left side. To eliminate this condition, the entire side was corrected by 1/64 in. Then the tires on the right side began to cut.

The significant thing about this example is that the present method employed on the great majority of railroads for laying out the frame and the shoes, or shoes and wedges, dependent upon the pedestal type employed, is very likely to introduce an overall error in alignment approaching or exceeding the 1/64 in. that can cause maintenance difficulties, add to operating cost, and reduce availability.

There may be several ways to lay out a locomotive frame without introducing serious errors in alignment, but the one which has been used by the North Western for several years seems so vastly superior to any other that it is puzzling to find that so few roads use this procedure. It involves the use of a transit for laying out the entire frame from the engine truck back to the drawbar, for determining the thicknesses of shoes and wedges, and for aligning the cylinders and guides. It is rapid, extremely accurate, and can be learned by an average competent mechanic.

What is probably the best proof of the worth of the transit method for laying out the locomotive frame and running gear is the results obtained on the C. & N. W. Class H-1 4-8-4 freight locomotives. Twenty-three of these locomotives have been modernized since April, 1946, and the first one recently received its third annual inspection after making approximately 300,000 miles. The following are typical of wear records attained on some parts affected by the alignment of the locomotive:

The shoes and wedges applied to the locomotive at modernization were still in place. The No. 2, 3 and 4 crank pins had sufficient stock to bring them into quarter and run at least another year. The bronze-lined steel valve guides were in good condition and suitable for another year of service. The valve and cylinder bushings did not require boring, and the original-size packing was still used in the cylinders. From the examination of the machinery, the railroad felt that the limiting condition for a term of service would be the tube-and-flue removal period. If a tube-and-flue extension appears advisable, the machinery might very well last a full five years, or 450,000 miles.

While the transit method of laying out the frame and running gear* cannot alone be credited with the excellent wear record of this locomotive, such outstanding wear could not have been achieved if the layout had not been accurately performed.

Changing Shop Requirements

A number of railroads have from necessity or choice delayed the building of electrical shops for Diesel locomotive maintenance. The railroad operating less than 50 or 60 locomotive units cannot in most cases justify having a "production maintenance shop", and larger operators who have delayed the building of such shops are in a measure justified by the fact that their requirements are changing constantly.

Most of the shops already built, have quickly become too small. It is also the experience of most operators that their shops have been designed with inadequate handling facilities. Nearly all of the parts which must be moved about the shop are too heavy to be handled manually and must be moved by cranes, or hoists. It has also been learned that with the improvements of procedure gained by experience and the improvement of materials, the number of units going through the shop is reduced. The mileage between general motor overhauls is being increased, and the need for the shop is nominally reduced. In other words, the good shop tends to work itself out of a job.

On the other hand, the overall need for railroad shops continues to increase with the increasing use of Diesel locomotives. The railroad with a shop run by experienced operators has just about as many motor failures as it did when the shop was new, but the failures occur in the shop and not on the road.

* This method is described in a report of the Committee on Shop Tools of the Locomotive Maintenance Officers Association in 1947. See RAILWAY MECHANICAL ENGINEER for October 1947, page 581-583.

Greatly improved lubrication has done much to reduce motor failures.

The need for production maintenance shops is not diminishing. Rather it is changing, and those waiting for shop requirements to crystallize will probably wait too long. Changes in methods will be taking place for a long time and in the meantime those who delay will find themselves lacking in the necessary trained personnel and operating experience.

Neutralizing The 40-Hour Week

During the meeting of the A. A. R. Mechanical Division at Chicago two railroad executives, G. Metzman, president, New York Central, and J. E. Goodwin, assistant to vice-president and executive president, Chicago & North Western, dwelt at length on the significance and effect of the introduction of the 40-hour week on the railroad industry. Mr. Goodwin, particularly, boiled the problem down to an understandable basis when he said, "It has been estimated that *if we go along as we have in the past with present work methods* (the italics are ours) it will require more than 200,000 additional employees and will cost the railroads close to 510 million dollars a year—which will be the same result as though an increase of 23½ cents an hour had been granted to all non-operating employees."

Before proceeding any further we'd like to make it clear that this is not a discussion of the 40-hour week and that we hold no brief for or against the introduction of the shorter work week. Whether it is practicable and economically sound or not is something that only its trial and time will tell—at this stage it is something that the railroad industry is going to have to contend with and it is a phase of railroad operation that is going to require a tremendous amount of hard thinking and ingenuity to cope with. The 40-hour week is not to be viewed as something out of the ordinary but is actually one of a series of expensive economic changes that have come along over a period of years that have to be dealt with and can be dealt with by the introduction of improved methods of operation and, above all, by the introduction of labor saving facilities that not only make it easier for fewer men to do more work but make it possible to do that work at substantial reductions in the dollar outlay for labor.

That is why we placed some emphasis on that part of the statement by Mr. Goodwin that had to do with going "along as we have in the past with present work methods". It should be obvious that with the cost of every detail of railroad operation going up all the time, as it has steadily done over a period of many years, we have definitely reached a position where we can no longer go along as we have in the past. We're going to have to introduce some new ideas in the job of maintaining equipment—both cars and locomotives—that will effect real economies in the billion and a half dollar expense account that the railroads now have to meet in the mechanical department alone.

Fortunately, there is no end of opportunities for effecting these savings. The introduction of Diesel power alone offers an opportunity in itself and it is presumed that with the years of experience in locomotive maintenance the maintenance shops and terminals for this type of power are being set up to handle inspection, repair and service at the lowest possible cost. The real savings, though, lie buried deep in the traditional methods and the obsolete facilities that are still being used for maintaining steam locomotives and cars. These are the man-hour-consuming factors in railroad equipment maintenance upon which should be turned the spot light of modern methods. The searching analysis of good shop engineering studies will reveal that the investment of many millions of dollars could be returned to the railroads in a remarkably short time.

It may not be out of place here to call attention to the fall meetings of the six mechanical and electrical associations that offer a place for mechanical men to find out how modern maintenance methods can be applied to today's problems. At these September gatherings of the steam and Diesel locomotive men, the car department supervisors, the electrical and airbrake maintenance men the answers to the way to save a substantial part of that 510 million dollars can most certainly be found.

Opportunity Confronts Railroad Diesel Clubs

The advent and rapidly increasing use of Diesel motive power on American railroads made it inevitable that groups of railway men and others interested in this type of power, and particularly those associated with it in their daily work, would eventually unite in clubs or associations for the consideration of mutual problems.

To serve men on different railways in the same general territory, the Southeastern Diesel Railway Club has been organized and meets every other month except during the summer in Jacksonville, Fla.; the St. Louis Railroad Diesel Club, started early this year, meets once a month in St. Louis, Mo., and the Chicago Railroad Diesel Club, just recently organized, performs the same function for Diesel locomotive operators and maintainers in the Chicago district. Presumably, Diesel problems of the rank and file of railway employees will continue to be con-

sidered on a national basis at annual meetings of the Locomotive Maintenance Officers' Association and from a general design and performance standpoint by the A. A. R. Mechanical Division.

Typical of the keen interest in this subject is experience with the Chicago Diesel club which was organized and temporary officers appointed early in June; held its first meeting on July 14 with an attendance of 277; and already has a paid-up membership of 312. While a formal constitution has not yet been adopted, the general objective of the club is to promote more reliable performance and increased availability of Diesel motive power at reduced cost through education in improved methods.

Railroads have a definite stake in this club and others like it; also the railroad men who increase their own knowledge, acquaintance and ability to express themselves by participating in the meetings; also the Diesel locomotive builders and material suppliers who benefit by anything which improves the performance of their respective products. Present plans are for the membership to include for the most part railroad men with the rank of master mechanic and below and supply men who will have equal rights to voice their opinions at club meetings.

Glamour No Index to Progress

Because the problems facing the mechanical departments of the railways do not change markedly from year to year, many people, even some who are entirely familiar with railway equipment and its maintenance, are inclined to depreciate the work done by the Mechanical Division of the Association of American Railroads for the advancement of railway transportation. They overlook the fact that, after nearly a century and a quarter of evolution, there are bound to be great changes in the character and extent of the developments which mark the progress of the industry from those which prevailed during its pioneer days.

For instance, there is a vast difference in the glamour surrounding the invention of the air brake, crude as were the early embodiments of that invention, and the development of the load compensating brake now in its late developmental stage. The glamour of the early invention, as we see it today, arises from our knowledge of all that has come of it during the years since 1869. The absence of glamour surrounding the refinement represented by the load compensating brake arises from the fact that our vision of its possibilities, up to now, is completely without the assistance of hindsight—we are so completely preoccupied with freight-train control as it is today that we find it hard to visualize the nature of an era in which all freight cars will handle approximately alike in that each furnishes its full proportionate part of the retarding effect to control the movement of the train mass whether it is fully loaded or empty.

This is only one development in which the Mechanical Division is concerned today. Confining this comment to matters within the immediate purvue of this year's committee reports, we may mention the matter of freight-car brake-beam development. It was only 16 years ago that a fine job was done on the development of brake beams for freight cars by the Mechanical Division and the manufacturers. But in the meantime, maximum car loads and train speeds on the main lines of American railroads have increased. The upshot of all this is that the painstaking work of 16 years ago just wasn't destined to be eternal in its capacity to meet the needs of railway transportation.

The act of revising specifications upward is not inherently endowed with glamour. Yet, its results in reducing maintenance expense and increasing reliability of freight-train operation during the next 10 to 20 years will be of incalculable value.

While on the subject of the work of the Committee on Car Construction, there is its work in encouraging and guiding the development of trucks for high-speed freight service. This began with the tests conducted by the Mechanical Division on the Bald Eagle valley line of the Pennsylvania in 1939. The extent of the influence and responsibility of the Mechanical Division in this development is indicated by a statement in the preface of the report of the 1939 tests: "It is evident that the majority of the trucks were entered in this test more on faith in their performance at high speeds than actual knowledge of it. . . . With the data accumulated from these tests, . . . manufacturers should be able to develop trucks that will perform satisfactorily in high-speed service."

The prediction of the committee and the success of the method are borne out by the results of the 1948 truck tests abstracted in a table elsewhere in this issue. Compared with the standard A. A. R. coil-spring trucks with various spring travels up to 2½ in. operating at speeds up to 65 m.p.h. and averaging approximately 42 m.p.h. and fully loaded to the 169,000-lb. axle limit, seven special designs of high-speed trucks, operated with loads of 145,000 lb. at speeds up to 90 m.p.h. and averaging about 60 m.p.h., registered average vertical lading damage indices scarcely more than one-seventh those of the standard trucks and lateral damage indices more than 20 per cent below those of the standard trucks.

None of these and other developments which might be cited possesses much glamour from the public viewpoint and those involved in such developments are seldom temperamentally disposed to read glamour into them. The fact is that in an old industry glamour is no index to progress.

ELECTRICAL SECTION

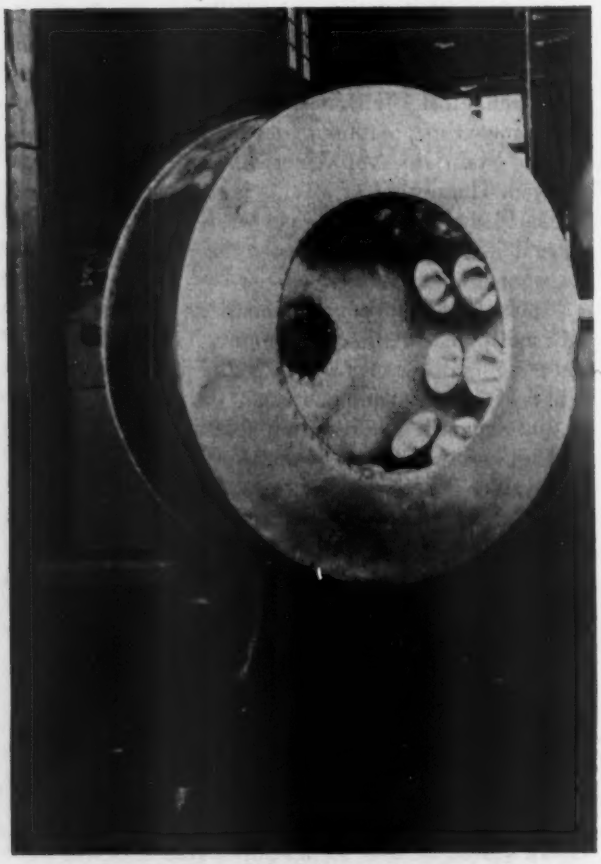


Fig. 1—Two rings of lamps are mounted in an insulated housing on a portable welded framework

Infra-Red Lamps In the Diesel Shop

Southern uses lamps to remove riser connections to preheat cross-connection insulation and to bake string band varnish

THE electrical shop of the Southern, at Atlanta, Ga., has developed several ways of improving its Diesel traction motor rewinding by means of infra-red lamps. All of the heating is done with a cylindrical insulated hood containing the lamps, and up to the present time, the shop has made three different applications of the device.

Heating Ring

The lamps used for heating are placed in two parallel circles inside an insulated drum as shown in Fig. 1. The drum has an outside diameter of 31½ in. and is 14½ in. deep. It is made of two sheets of 1/16-in. aluminum with ¼-in. of asbestos insulation between the two sheets. The large opening at the front has a diameter of 18 in. and the smaller hole at the back is 7 in. in diameter. The ring on which the lamps are mounted has a diameter of 33 in.

The welded frame which supports the drums is mounted on casters. The connection between the frame and the drum consists of two splines or guides (a rod within a tube) and a center supporting screw which permits adjusting the height of the drum to suit the height of the armature stand.

There are twelve, 250-watt, 115-volt lamps in each circle. Power is supplied from a 220-volt, 3-phase,

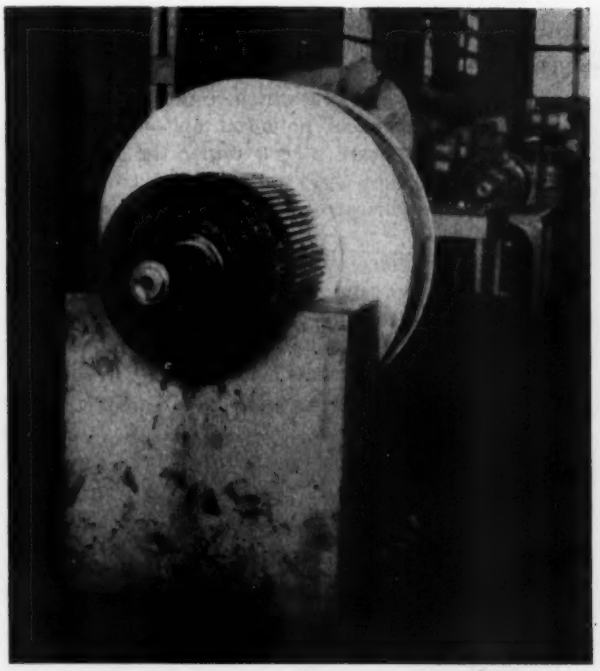


Fig. 3—The lamp ring as used for heating risers

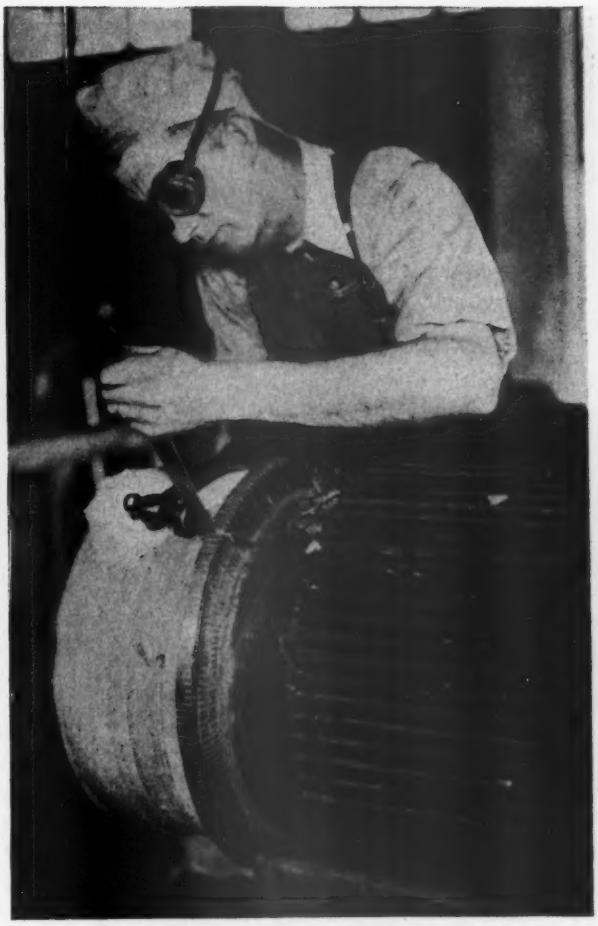


Fig. 4—After heating the coil ends are knocked out with a hammer and drift

60-cycle circuit with the lamps connected in 2-circuit delta as shown in Fig. 2. The drum type rotary switch, mounted on the frame below the drum, has three positions,—one of which is "off", a second which connects every other pair of lamps in the circuit, and a third which turns on all the lamps.

Stripping Risers

In the process of stripping coils from an armature, the coils are cut off close to the commutator risers. There remains the job of removing the coil ends, which are soldered into the riser slots. The usual procedure consists of heating the risers with a flame

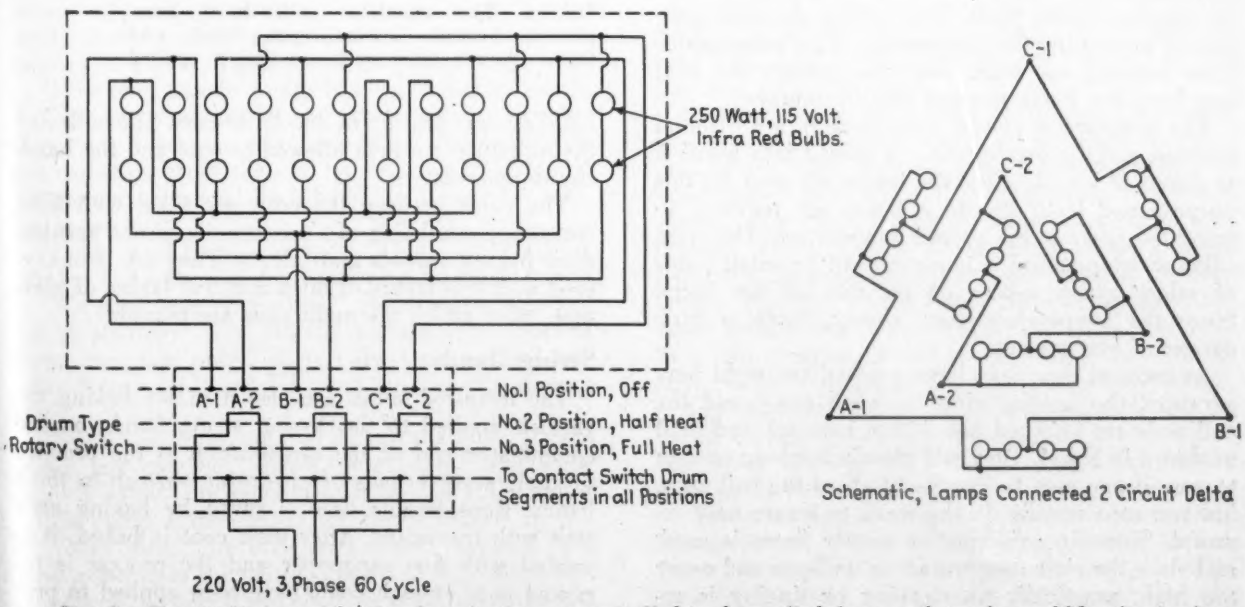


Fig. 2—Circuit diagrams showing how lamps are controlled and supplied from a three-phase, 220-volt circuit

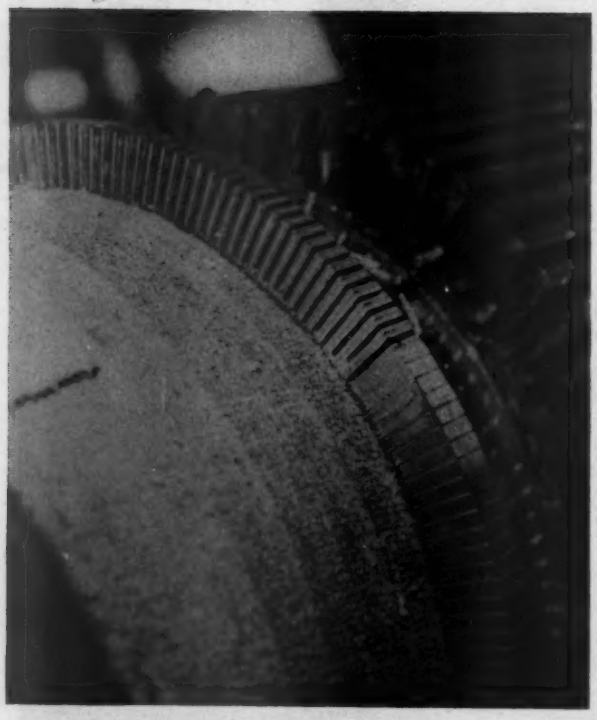


Fig. 5—An armature with its commutator protected with asbestos and part of the coil ends removed after heating with the lamp ring

and then driving out the coil ends. This is effective, but causes some roughening and blackening of the slots which makes it necessary for them to be cleaned with a file, and perhaps retinned before new coils can be soldered in. Also, there is the danger of damaging or burning the mica segments of the commutator when an open flame is used to melt the solder.

To strip the coil ends from the risers, the commutator is first wrapped with asbestos such as used for lagging steam pipes. This serves the dual purpose of preventing the temperature of the commutator from running too high, and also reduces the heat loss from the risers through the commutator.

The armature is placed on a block in a horizontal position and the heating ring is moved into position as shown in Fig. 3. All of the lamps are used for this purpose and from 2½ to 3 hours are required to bring the risers to the proper temperature. The right value of temperature is made evident by small beads of solder which appear on the face of the risers. Since the temperature rises slowly, there is little danger of overheating.

As soon as the risers have reached the right temperature, the heating ring is rolled away and the coil ends are knocked out with a hammer and drift as shown in Fig. 4. They will remain hot long enough to permit one man to knock out all of the coil ends, but two men usually do the work to insure easy removal. Since no oxidizing or smutty flame is used, and since the riser temperature is uniform and never too high, practically no cleaning or tinning is required before the new coils are installed.

Equalizer Coils

The lamps are also used for the application of equalizer coils. These coils which connect commutator bars of equal electrical potential on opposite sides of the commutator are placed under the main coils in the space between the risers and the coil slots in the core. Their ends are soldered into the bottom of the riser slots.

After the equalizer coils are placed, they are heated with the lamp ring until the insulation is soft. Then temporary banding wire is run over the coils with squares of thin sheet iron or tin placed between the band wires and the coils to protect the coils. A

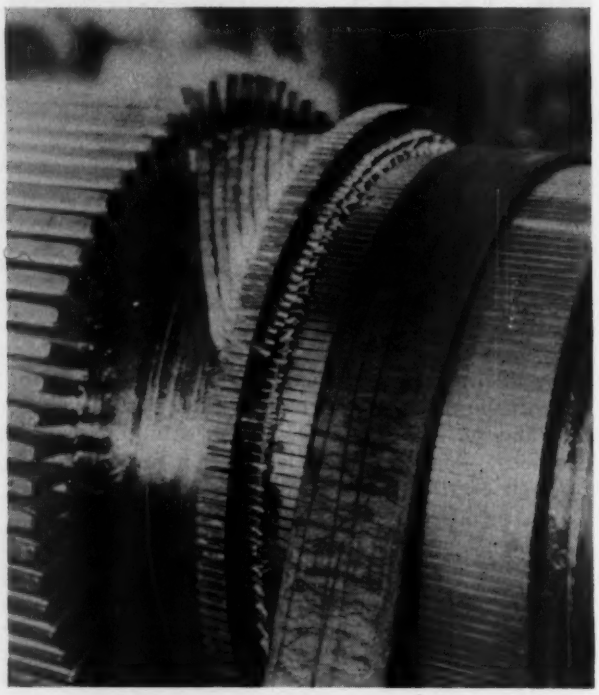


Fig. 6—The equalizer coils have been placed, heated, drawn tight, filled and taped—Lower main coils are being applied

banding wire tension of 350 lb. is used. The coils and the armature are then allowed to cool and the banding is removed.

The voids between the coils are filled with filler compound consisting of a mixture of silicone varnish, clear baking varnish and talcum. They are then covered with five layers of mica and five layers of glass tape, after which the main coils are placed.

String Bands

The infra-red lamps are also used for baking the varnish applied to the V-ring string bands on the commutator end of the armature. It is the practice to apply several coats of air-drying varnish to these bands. Considerable time is saved by baking each coat with the lamps. After each coat is baked, it is sanded with fine sandpaper and the process is repeated until enough coats have been applied to produce a smooth finish.

ON GOOD GROUNDS

By Walt Wyre

THE newest Diesel-electric locomotive, the 9048, pulled into the service track at the Plainville roundhouse of the S. P. & W. Twelve months before, at least half the force would have found some excuse to go out and see it, but this time only the servicing crew and Ed Martin, the Diesel shop foreman, went out.

Charley Waters, who came with the locomotive from the factory, climbed down from the rear cab. Waters had, on previous trips, spent some time around Plainville and knew his way around the shops. He started toward the Diesel shop when Martin saw, and recognized him. The Diesel foreman walked over to meet Waters.

"How did she go?" Martin asked.

"Fine," Waters told him. "Everything okay except a little electrical trouble in the No. 2 unit. Where's Sparks?"

"You'll probably find him in the electric shop," Martin told Waters. "I'll be over that way in a few minutes. Just leave your bag in the office," he added.

Waters found Sparks in the electric shop talking to the division engineer. "Don't let me interrupt you," he told Sparks. "I've got to go to the master mechanic's office; be back in a few minutes and tell you about a little job on the 9048 that just came in."

After Waters left, the division engineer said, "As I was saying, we didn't have any appropriation to put an electric water pump at the section foreman's house at Moore's siding, but we already had a line from the pump house for lights. The windmill that pumped water for years wore out and I figured a small automatic water system would cost less than putting a quarter of a mile of pipe from the pump house."

"How long has the pump been in?" Sparks asked.

"Just installed last week," the division engineer said, "but it has been used very little. The motor gets hot and stops every time we try to run it. The signal maintainer connected the wiring; he figures the voltage is too low."

"Could be," Sparks agreed. "That's quite a long line for 110 volts. Do you know what size wire it is?"

"We can't run new wires," the division engineer cut in sharply. "I've already got my ears knocked down over that outfit. Now I don't dare spend any more money on it and I'll catch thunder if it doesn't work."

"Guess I could go out and look at the water station pump and controls," Sparks suggested, "and while there it wouldn't be much trouble to look at the motor on the pump at the section foreman's house."

"Good idea," the division engineer nodded, "I'll send a memo to the master mechanic suggesting that you check the motor and controls at the pumping station at Moore's siding. Be sure to charge your time that way," he added as he turned to leave the electric shop.

SPARKS started towards the Diesel shop, saw Waters coming from the master mechanic's office and waited for him.

"Let's go back to the electric shop," Waters suggested, "and I'll tell you about the trouble on the 9048."

"You know," Waters began when the two were seated in the electric shop, "two kinds of equipment often give trouble—brand new and real old. With new equipment, particularly that as well designed and carefully built as Diesel-electric locomotives, most troubles that show up, are little things such as a relay that needs slight adjustment, load regulator sticking a little, maybe a connection worked loose, and so on. But you know that as well as I do. What I'm getting at, is the trouble I had coming up on the 9048."

"Electrical trouble?" Sparks asked.

"Yes," Waters replied. "The way it acted, I'd say there is an intermittent short or ground somewhere in the control or alarm circuit. The wheel slip light came on and the ground relay tripped two or three times in the No. 2 unit," Waters explained, "and," he continued, "The alarm bell rang sort of feeble like, could just barely hear it. Wish you would check it over and see if you can find what's causing the trouble."

"Okay," Sparks agreed. "They should be about ready to run her in the house. I'll go over right away and check it." Sparks gathered up his tools and headed for the Diesel shop. Waters walked with him part way, then turned towards the office to get his bag and go to the hotel.

Sparks checked every place he figured there could be a ground or short in the control circuit in the No. 2 unit of the 9048 without finding any indication of what caused the trouble. He checked all relays and wiring. His megger showed plenty of resistance to ground. Three or four wire connections were a little loose, but not loose enough to cause trouble, the electrician figured. He tightened them, however, and made certain they were clean and making good contact. He checked the wheel slip relay and ground relay. Both were apparently working as they should.

Sparks, figuring that the 9048 would probably be called and gone before work time next day, left a report for Waters. He knew in reason the factory man would ride the Diesel.

Next morning when Sparks came to work, the 9048 was gone, and Waters with it. They left at 3:15 a.m. If run through as the Diesels usually were, the 9048 wouldn't be back in Plainville until some time the following day.

Work wasn't too pressing in the shop and Sparks decided to go to Moore's siding and see about the water pump at the section house. He left about nine-thirty, driving the shop pickup. It didn't take quite an hour to drive the thirty-eight miles to Moore's siding.

He stopped first at the pump house and examined the motor and controls. The contactors in the controller were pitted and burned, so he cleaned and dressed them, then checked the oil in the motor bearings.

Power for the motor, a 7½ horse, three-phase, 220-volts, came from an R.E.A. line that passes near the pump house. Two transformers, hung on a pole, stepped the voltage down to 220. Typical of R.E.A. construction, the line uses a common grounded neutral for the high line and single phase services.

The 110-volt line from the pump house to the section house appeared small. Sparks decided to see what size it was. There wasn't any ladder around and he had neglected to bring his climbers. He found a piece of bridge timber, propped it against the building and climbed up, but still lacked at least three feet of being high enough to tell for sure what the size of the wires was. He finally made it by driving the pickup alongside the building and standing the timber in the pickup. He found the line to be No. 10 hard drawn. Evidently the signal maintainer had figured that a few low wattage lamps were all the electrical apparatus that would ever be used in the section house and nobody would ever notice if they burned slightly dim.

While Sparks was examining the wires, a middle-aged woman carrying two buckets came to the pump house. "Are you going to fix our pump so it'll run?" the woman asked abruptly.

Sparks eased himself down from the piece of bridge timber to the pickup before answering the question. "I'm going to look at it," Sparks told her.

"Looking at it don't do no good!" and the woman set the buckets down with a bang. "Half a dozen people have already looked at it, but it still won't run. I thought when they put in the new pump, I wouldn't have to tote any more water, but now I have to tote it all the time. I wish they'd get it fixed or else git us a new windmill. Sam,—that's my old man,—could

". . . or else git us a new windmill"

usually keep the windmill working, when the wind was blowing.

"Well, I'll see what I can do about it," Sparks replied, "but I'm afraid that there's not much I can do without putting up some new wires. These are too small," he added.

"That's what the man from the place that sold the pump said. He told Sam, my old man, that the wires would have to be bigger. Dinner'll be ready in about fifteen minutes after I get back to the house," the woman added,—"You might as well come on up and eat. All the rest that come to look at the pump et with us. We ain't got much, but you're welcome to what we got sich as it is."

"Thanks," Sparks replied. "I don't imagine there's much use of me staying very long unless I can do some good. I was just fixing to drive up there. If you'll let me have those buckets, I'll fill them and haul them in the pickup. You might as well ride too," he added.

THE pump Sparks found to be a deep well, air jet type, using two pipes into the well. The motor was one-half horsepower with outside connections for either 110 or 220 volts. Sparks connected a voltmeter on the line, and found it to be about 112 with the motor not running. When he closed the switch the voltage dropped to below ninety. The motor started reluctantly to turn. Before it gained sufficient speed for the cut-out to operate, the thermal overload in the motor opened. Sparks pulled the switch, and scratched his head.

At that moment the section foreman's wife came to the back door and called out, "Dinner's ready."

Sparks started to decline the invitation, but the woman insisted. "It's dinnertime, and you got to eat," she said.

The house was neat and clean. The beans were well cooked, the hot biscuits light and fluffy. Sparks ate two plates of beans, more biscuits than he wanted to count, and some wild plum jelly with more biscuits for dessert. Altogether a very satisfying meal. He thanked the lady, then went back to trying to figure out what could be done to get the water pump working.

The line to the pump came from the section house. It was connected to a circuit in the attic—No. 12 wire. That, of course, increased the drop somewhat but larger wires there wouldn't reduce the resistance sufficiently for the motor to operate.

"Well, are you going to be able to get it going?" the section foreman's wife asked when Sparks climbed down from the attic.

Sparks slowly shook his head. "I'm afraid not unless the division engineer will let us run a new line with larger wire. I'll talk to him about it," Sparks promised as he began gathering up his tools.

Sparks reached the roundhouse about three-thirty. The first thing he saw was the 9048 standing on the service track. He parked the pickup, gathered up his tools and headed for the electric shop. He wasn't greatly surprised to find the Diesel factory man waiting for him.

"More trouble?" Sparks asked.

"More just like we've had," Waters said. "It beats me! Seems like we've checked everything and every place it could be. It was worse this time than before. A dozen times between here and Sanford the wheel slip light came on, the ground relay tripped and all just like it's been doing right along. We turned it at Sanford and came back with a light train.

"I checked and rechecked, even swapped the ground relay for the one in the No. 4 unit. Thought for awhile that did it. We went along nearly thirty minutes without any trouble, then it happened twice in less than fifteen minutes."

"Well, I don't know," Sparks scratched his head thoughtfully, "we must be on the wrong track some place. At least we're not getting any place on this one. I'd like to do a little figuring and thinking before working on it again."

"We've got to get it fixed soon," Waters said seriously. "My boss will be here day after tomorrow and the first thing he'll want to know is why, if we don't get it fixed."

"Maybe we had better get after it," Sparks suggested, "but I'll swear I don't know where to start. There isn't much use retracing what we've done."

"Guess you are right," Waters agreed, "but from all indications there must be a short or ground some place."

"That's it!" Sparks snapped. "A ground, that'll fix it!"

"What in hell are you talking about?" Waters asked. "There isn't any use of both of us going nuts over this thing."

"Oh, I was thinking about something else—another job I was on this afternoon. I sure am dumb!"

Then Sparks told Waters about the water pump at the section house, and the poor woman "toting" water.

"How long would it take to fix it?" Waters wanted to know.

"Oh, not more than an hour, I'd say. Shouldn't take that long. Why?"

"They're holding the 9048 for us to work on tomorrow. I thought maybe if you wanted to drive out and fix the water pump for the lady, I'd go with you and watch."

"Well, let's see, it's just about four o'clock now—be a little after four by the time I get gas in the pickup and check the oil and water, be around seven o'clock by the time we get back if the ground relay don't trip." Sparks grinned at his own attempt to joke about the trouble in the 9048.

"What tools will you need?" Waters asked.

"Just my tool box and about fifty or sixty feet of No. 8 weatherproof wire. I've got a piece of a roll in the corner that will be enough." Sparks hesitated a moment to think. "Oh, yes, we'll need a couple of service knobs. You'll find them in the lower left hand bin; better take three.

"Guess I'd better go by the master mechanic's office and let him know what I'm figuring on doing," Sparks said after the tools and wire were loaded in the pickup. "We get gas at the storehouse pump right across from the office," he added.

"This idea had better work," Sparks said as he steered the pickup through the gate towards the highway. "If it doesn't, the division engineer will be belly aching about the overtime for the next six months."

"What are you going to do?" Waters asked.

"I'll explain as we go along."

Sparks drove somewhat faster than usual and reached Moore's siding just shortly after five o'clock. The section foreman's wife was just getting to the house with two buckets of water.

"Back again?" she said wearily.

"Yes, and we hope to get your pump working this time," Sparks told her.

"I'll fix supper for you," she said.

Sparks started to tell her they wouldn't stay, but the back door slammed against his words.

"Dad blast it, I forgot a stepladder!" Sparks exclaimed. "Guess I'll have to stand on top of the pickup cab to connect the wires at the house."

"What can I be doing to help?" Waters asked.

"You can run a wire from the corner of the well house to where the service wires go in the section house," Sparks told him. "I'll chase down to the pump house, and change the connections there. I'll pull the switch soon as I get there," he added.

Sparks returned in about fifteen minutes. Waters had the wire run as directed.

"What next?" Waters asked.

"Well, you can change the motor connections to 220,—there's a diagram on the plate,—while I do a little wiring that's not strictly according to code, but it's perfectly safe and should work," he added.

The R.E.A. line passed right along the fence beside the well house. There was a guy wire to a pole not over two steps from the well house. Sparks loosened a guy wire clamp, and fastened the end of a piece of No. 8 under the clamp and tightened the nuts. He then ran the wire in a trench to the well house, and up the side and connected it to the wire Waters had put up to the section house.

"You see," he explained to Waters, "The R.E.A. uses a common ground. The guy wire is fastened to it. I changed the grounded side of the line to a hot wire at the pump house, making it a 220-volt line. The neutral from the guy wire and either hot wire will give us 110 volts for the section house, and we'll have 220 volts for the pump motor."

"Fairly simple," Waters commented. "After you see it," he added.

The pump ran okay. In a matter of minutes the gauge showed forty pounds pressure. Sparks went to the house to try the water. The section foreman's wife was in the kitchen standing by the stove. On a table by the sink were two platters, one filled with chicken fried golden brown. The other platter contained fat side meat also fried.

"Get it fixed?" the lady turned and asked.

"Think so," Sparks said and turned a faucet. The water poured.

"Then you'll get chicken for supper." She shoved the platter of side meat away and picked up the platter of fried chicken.

"Best meal I've had in many a day," Waters said as they headed back towards Plainville. "Now if worrying about the 9048 doesn't give me indigestion, I'll be okay. Anyway, I've sure enjoyed coming out with you."

"Let's not start worrying about the 9048 until tomorrow," Sparks suggested as he stepped on the starter.

NEXT morning when Sparks came to work, he found Waters already on the job. The factory man had blueprints of wiring diagrams spread out all over the work bench.

"Figured out anything?" Sparks asked as he began changing into his work clothes.

"Not a thing that I didn't already know," Waters replied, "which is exactly nothing. I'm going to the office and get my mail. Maybe I haven't even got a job." Waters started to gather up the blueprints.

"Leave them there, if you don't mind," Sparks said. "I'd like to look them over a little."

After Waters left, Sparks leaned over the bench and began tracing circuits with a pencil, marking lightly on the blueprints just enough to see the lines. He traced a while and scratched his head a while. He did that for at least thirty minutes after the whistle had blown and the other electricians had left the shop.

The Diesel shop foreman came to the electric shop and wanted to know when the electrician was going to start working on the 9048.

"Be out there in a few minutes," Sparks told him and began folding the blueprints. Then he stopped, and laid the papers back on the bench and began tracing circuits again. In about five minutes he pushed the blueprints to the back of the work bench, picked up his tools and headed for the electric shop.

"Where's Waters?" Sparks asked the Diesel shop foreman.

"He's down at the office writing some letters. He said to tell you he'd be up after a bit."

Waters came to the Diesel shop wearing a face long as a bell cord. "Started on it yet?" he asked hopelessly.

"Finished!" Sparks said—"I hope."

"Well, if you are fairly certain, I'll tell them to take a call on her. They're raising cain to use her. What did you find?"

"I'd rather wait until she makes a trip to tell you. I could be wrong," Sparks added.

"Well, we'll soon find out," Waters said. "I told the master mechanic I wanted you to ride her with me to Sanford at least."

The 9048 was called for 10:45. She made the trip to Sanford without any trouble. Just before they got there, Sparks pulled a copper terminal from his pocket and handed it to Waters. "That's what was causing the trouble."

"Why, that looks like a connection from the terminal block of a coupler receptacle at the end of a unit," Waters said.

That's what it is. Somebody got in too big a rush and did a poor job of soldering. Vibration worked the wire loose and then it burned some which made it worse.

"Which wire was it?"

"The common negative, the bottom one on the print here." Sparks unfolded a print and showed him.

"How did you come to find it?" Waters wanted to know.

"Well, after you left the electric shop, I kept tracing circuits and checking off everything we had gone over already. That didn't leave much but the control coupler receptacle. We had already tried another cable between the units."

"But that was a loose connection, not a ground

(*Continued on page 467*)

Cleaning of Air Conditioning Filters

New York Central adopts new system which improves the quality of work done and reduces the time required

By G. S. Glaiber*

DUE TO the large increase in the required daily exchange of filters for air-conditioned cars, the New York Central has devised a new system of cleaning these filters. This increase came about due both to the increase in the number of air conditioned cars as well as in the case of specialty cars, and the increase in the number of filters per car.

The former practice was to blow the filter to remove loose dirt and then boil it for 20 minutes in a cleaning solution. Following this, considerable time was consumed in drying the filters out before dipping in filter oil. This process was both time and space consuming, so that the filter cleaning facilities became inadequate and the cost of handling, of course, was high considering the possible output of the filter cleaning plant. This necessitated extending the number of hours per day devoted to this work.

One of the New York Central electricians at Albany, N. Y., station coach yard, decided one day to experiment with a filter cleaning arrangement utilizing the lifting steam gun used for evaporator cleaning. He based his idea on the fact that this gun used steam to raise the cleaning solution, heating it at the same time and it cleaned evaporators very well. At the same time, there was also another problem in filter cleaning that boiling them did not solve. That was that where the filters were used in dining cars a con-

* General Supervisor of Electrical Equipment, New York Central System.

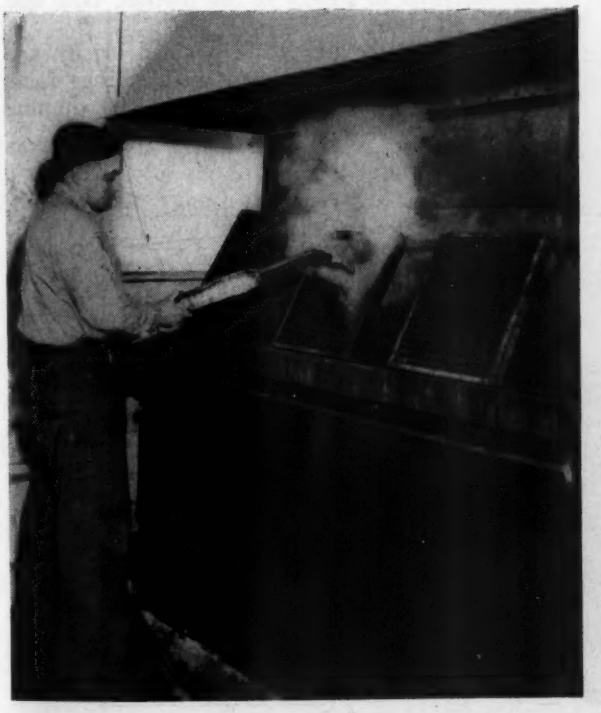


Fig. 1—The hot solution is picked up by the gun and blasted against the filter

Fig. 2—The drying oven in which hot air is blown over the filters

Fig. 3—The dipping tanks in which the oil is floated on water

siderable amount of the nap from the carpeting worked its way into the intake side of the recirculating air filter and after boiling formed almost a felt-like layer. Chemicals strong enough to dissolve the layer damaged the filter media.

Therefore, it was thought that the blast from the steam lift gun would loosen the layer of material while cleaning the filter.

The first experiments were performed by merely propping the dirty filter up again the side of the wall on an angle and steam cleaning it with the same solution used for cleaning evaporators. The results were so good that this simple experiment became the actual basis for the system of air conditioning filter cleaning now adopted on the New York Central. A sketch of this arrangement was made up, and the filter cleaning plants were fabricated as shown in the illustrations.

Under the present arrangement, the filters are shaken to remove the loose dirt and then placed in a row on the frame under the hood over the tank of cleaning solution. The hot solution is picked up by injection with a steam lift gun as shown in Fig. 1, and blasted against the filter.

In this manner, several filters can be cleaned at one time, the time per filter cleaning being less than a minute. The surplus cleaning solution drains back into the tank below and is re-used. The fumes from the operation are lifted up in the hood and exhausted. Each morning the sediment in the bottom of the cleaning tank is drained off, and an equivalent amount of solution added. After cleaning, the filters are placed in a drying oven where, with forced hot air draughting, they are dried in a few minutes.

The drying oven utilizes the coils and fan from an old precooling machine. This drying oven arrangement is shown at the left in Fig. 2. The filters when dry are then ready for dipping. The method of dipping is shown in Fig. 3, and incorporates a unique arrangement wherein the bottom of the tank is filled with water. The level of the water is below that to which the filters are dipped. The water is pumped periodically through the tank and dissolves the impurities in the oil, and is drained off. This eliminates an accumulation of sludge in the dipping tank and keeps the oil clear.

After dipping, the filters are drained briefly and then placed on a corner upright in a storage rack. The surplus oil drains out and back into the dipping

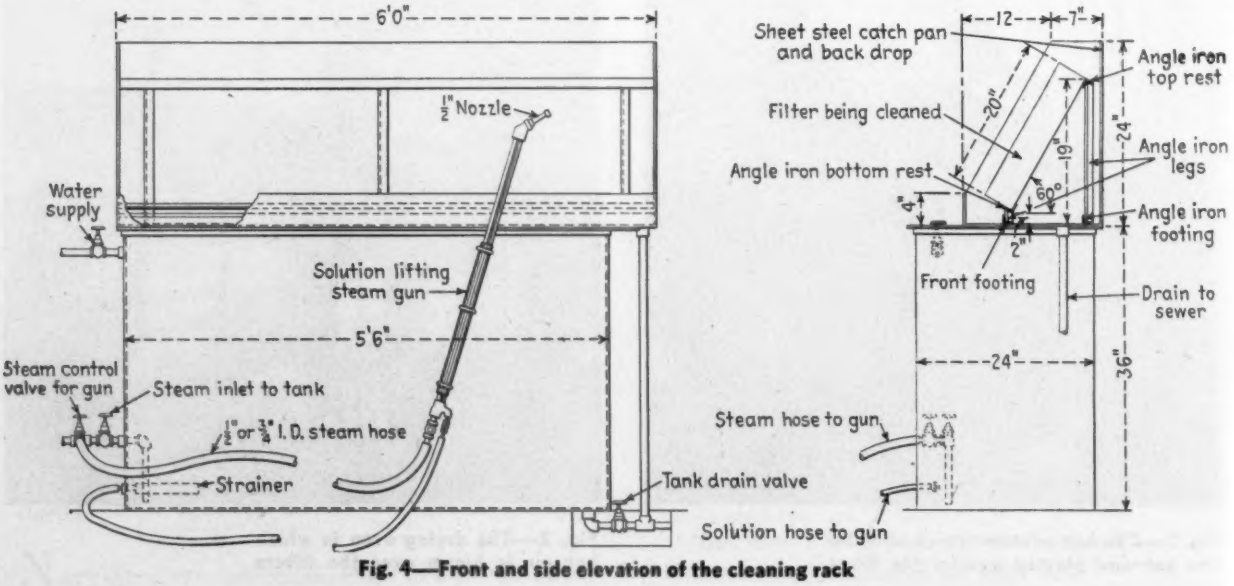


Fig. 4—Front and side elevation of the cleaning rack

tank. The racks are enclosed and heated thermostatically to a 110 Deg. F. This drives off surplus oil that might drip off later if in service, especially in hot weather. The racks are loaded in rotation, and the oldest stock used first. The filters are then withdrawn as needed and exchanged at the cars for the ones to be cleaned.

In this manner, many thousand filters are cleaned each week on the New York Central, though not of course in the one plant shown. This plant, which is in service at the Buffalo coach yard, is the latest type of plant, and is a far cry from the original experiment, although the ideas for its construction were originated at that point.

The New York Central's air conditioning filter exchange program is to change all filters once a week, with the exception that during the cooling season, on dining cars equipped with mechanical refrigeration, etc., the entire car set of seven filters is exchanged every four days.

In the course of modernizing our filter cleaning plants for servicing air conditioning filters, a different type of filter oil was adopted. Previously, motor oil SAE-30 had been used, but this did not prove adequate and experiments were made using a more viscous filter oil.

This oil has a peculiar property in that it is tacky and adheres in greater quantities to the mesh of the filter media. Experiments proved that this oil gave a far greater holding capacity to the filter, and it has been adopted as standard on the New York Central System.

At the Mott Haven Yards (New York City) where the filter cleaning plant is located in one corner of the yard, normally there would be a great deal of time lost in taking filters from one end of the yard to the other and arrangements have been made to have separate storage racks provided in each of the several yards comprising Mott Haven Yards. These filters are delivered to these racks by truck, and dirty filters returned by the same truck to the filter cleaning plant. Then the various gangs withdraw filters needed for the line that they are working on, with the result of much time saving.

On Good Grounds

(*Continued from page 464*)

or a short," Waters objected. "I don't see how that could cause the ground relay to trip."

"It must have," Sparks grinned. "The trouble hasn't showed up since a new terminal was put on, and I didn't do anything else to it."

"Can't argue against that," Waters agreed. "I'm just glad it's fixed, and if we finish this trip without the trouble showing up, I'll have to admit that it must be fixed."

Sparks got off at Sanford and caught the Limited back to Plainville.

The 9048 made the trip okay, returning to Plainville next day.

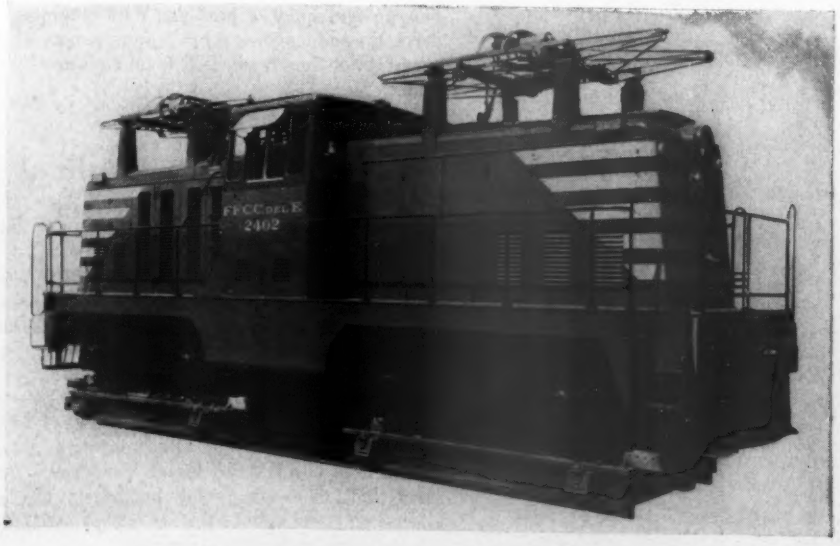
Waters came to the electric shop, carrying a large paper sack. He handed it to Sparks. It was a new hat.

Sparks lifted the hat gingerly and tried it on. It fit to a T.

"Gosh!" Sparks exclaimed. "Christmas is early this year!"

3,000-Volt D.C. Locomotive for Chilean State Railway

A dual-purpose, 3,000-volt, direct-current locomotive has been built for the Chilean State Railway by the General Electric Company in its Erie, Pa., plant. For road service the locomotive is designed to operate with power being supplied to the four GE-745 traction motors directly from the 3,000-volt, d.c., overhead line. In this service, they have an hourly rating of 1,500 metric hp. and a continuous rating of 1,285 metric hp. In switching service, the motors operate at 1,500-volt d.c. power supplied by a dynamotor-generator set which obtains power from the 3,000-volt overhead line. Each locomotive has two operating stations, two pantographs, is 41 ft. long, and has a maximum permissible speed of 80 kilometers per hour.



Dual-purpose, 3,000-volt, d.c. locomotive for Chilean State Railway

NEW DEVICES

Clamp Ammeter And Voltmeter

An a.c. clamp ammeter and voltmeter, with five current ranges up to 1,000 amp., and three voltage ranges up to 700 volts, has been announced by the Weston Electrical Instrument Corporation, Newark, N. J.

Known as Model 633, Type VA-1, this instrument is designed to measure alternating currents and voltages without interrupting electrical service. Current measurements are made simply by placing the heavily insulated, trigger-operated clamping jaw around the conductor. Jaws will accommodate conductors, bare or insulated, up to two in. in diameter. Voltage measurements are made by connecting a set of clip-on voltage leads (six-foot leads are supplied) to the line, and to the screw-type terminals recessed in the side of the meter. Current and voltage measurements can be made almost simultaneously by rotating the thumb-selector switch to either the ampere or volt position. A pointer stop has been provided to show motor-starting currents.

To prevent shorts when measuring current on bare conductors, the jaws of the meter are insulated with tough rubber sleeves. Operation of the jaws is simplified by the single positive acting trigger, which can be operated by one hand when making current measurements.

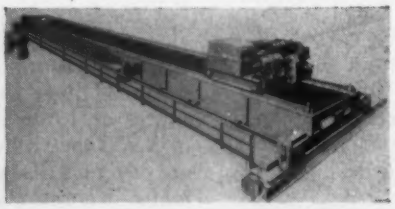
The instrument has a rated accuracy within three per cent of the full scale range (this applies to each of the eight ranges) when used on frequencies between 50 and 70 cycles.

Traveling Crane With Fluid Drive

Three innovations are now available on the cranes manufactured by the Whiting Corporation, Harvey, Ill. These features are the streamlined, full-vision cab, magnetic controllers, and fluid-drive (hydraulic couplings) on both bridge and trolley motors.

The illustrated full-vision cab represents an advanced type of control booth for overhead traveling cranes. By moving short, fingertip levers, the operator, in a comfortable, non-fatiguing, seated position, controls all crane motions.

Using magnetic controllers, only low voltage is run into the cab. This eliminates the use of cumbersome drum-type controllers which reduces maintenance. The fluid drive allows the use of inexpensive electric motors and results in faster pick-up and quicker braking. With fluid drive, the sudden reversal of motors is not harmful nor dangerous as it is on conventional cranes.



Hydraulic Shop Presses

A line of presses in 60- and 80-ton capacities has been announced by Rodgers Hydraulic, Inc., Minneapolis, Minn. Standard shop presses are now available in sizes ranging from 60 to 400 tons. Designed to answer the need for light-duty press requirements, the new models provide versatile action for shop use.

Features include a full 13 in. pressure stroke, matched and machined V-blocks, lower bolsters supported by bearing blocks on steel pins, fast arbor press action eliminating need for separate arbor press, and operation by either hand or power pumps.

A two-speed hydraulic hand pump with automatic shift, permits a fast ram speed of 1⅛ in. per stroke with 2-ton high speed pressure on the 60-ton unit and ¾ in. travel with 3 tons on the 80-ton press. When the maximum 2 or 3 ton pressure has been reached, the pump shifts automatically into high pressure. These presses may be equipped with power driven pumps for faster speed.

Universal Table Utility Shaper

The shaper illustrated is again in production with several refinements. The table of this machine, announced by the Cincinnati Shaper Co., Cincinnati, Ohio, is supported directly on the cross rail without an apron and is heavy enough to take the full load without table support. This construction adds to the rigidity of the table by reducing the overhang.

The units are equipped for higher speeds making the use of carbide tools on the shapers a practical and profitable application. Cutting speeds over 250 ft. per min. are possible on a 10-in. stroke.

Other features include automatic lubrication to all bearings including the table bearing on the rail, single point taper gib adjustment, improved rail lock that operates from the operator's position, improved tool lifter, power down feed to the head and power rapid traverse to the rail.

IMMEDIATE . . .

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- **Immediate reduction in replacement and wheel shop costs.**
- **Immediate delivery from 26 strategically located member plants—reducing inventory requirements.**
- **Improved design—assuring greater safety, strength and durability.**

★ ★ ★

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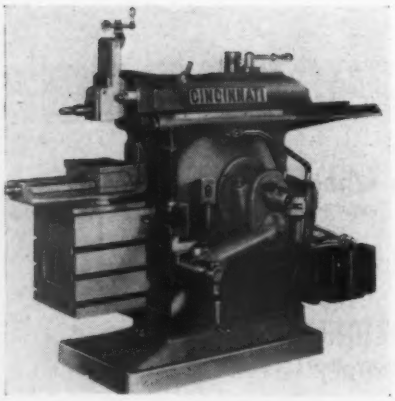


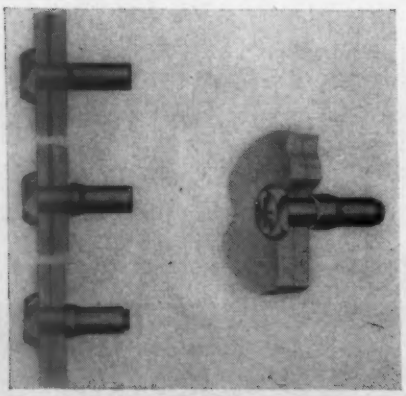
The models are made in 16-in. and 20-in. stroke sizes and can be equipped with a 3- or 5-hp. motor drive.

Protruding Type Steel Rivets

The CKR series of rivets are designed for heavy gauge sheet metal fastening jobs. Called Blind Thread rivets, they are available as a standard line in ¼, 5/16, and ⅜ in. diameters and in grip lengths from ⅛ to ¾ in. The rivet material is steel and the head style is protruding.

These rivets available from the Cherry Rivet Company, 231 Winston St., Los Angeles 14, Calif., are installed from one side of the job by one man. The tool used is an automatic screwdriver fitted with a Cherry adapter. This adapter has interchangeable tips that take care of the three rivet diameters.

The adapter fits over the head of the rivet and holds the rivet firmly in place. A rotating bit within the adapter, fits into the head of a steel machine screw. With the tool held firmly and squarely against the work and in line with the rivet, operation of the automatic screwdriver rotates the inner screw and draws the steel collar over the shank. The collar expands as it is drawn over the shank and bears against the blind side of the work. The formation of the blind head in this manner clinches the sheets tightly together.

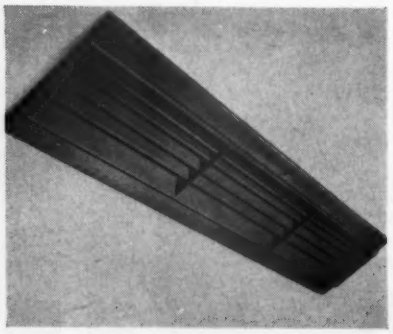


In the illustration, rate of progress is shown. At the top, the rivet is being inserted. At position 2, the tool turns the threaded core and the expanding rivet shank pulls the collar against the back sheet. In position 3 it is noted that the clinching action is complete when the steel collar fully expands the rivet shank. To the right is the cutaway showing the rivet head and expanded collar with the sheets drawn tightly together.

Straight-Line Aspirating Diffuser

A straight-line-aspirating air diffuser, designed primarily for installations requiring long rectangular units, such as railroad cars, has been announced by Anemostat Corporation of America, 10 East 39th street, New York.

The standard length of the straight-line diffuser unit is 60 in., although this dimension will be varied by the manufacturer to suit the user's needs. Air quantities handled are 15-20 cu. ft. per min. for each foot of diffuser length, and a double row provides up to 40 cu. ft. per min. Tip velocities are about 700 ft. per min. through the valving arrangement, when handling design air quantities. The



maximum static resistance is 0.2 in. of water.

Air distribution is equalized throughout the length of the straight-line diffuser installation by means of adjustable volume shutters which are accessible on the face side of the unit. The shutters can be adjusted along every foot of the outlet, and the air is controlled to every inch of the diffuser. Thus, air distribution can be equalized from end to end, regardless of overall length.

The diffuser is fabricated so as to facilitate its use in individual panels of varied lengths, or it can be assembled into continuous extended strips. Many combinations are obtainable, with or without continuous or indiviual lighting fixtures. Units may be mounted back to back to form one diffuser, or may be separated so as to accommodate all types of lighting arrangements.

Like the circular Anemostat air diffuser, the straight-line diffuser provides up to 40 per cent aspirating action. Within the diffuser, 40 cu. ft. of room air is drawn in and mixed with every 100 cu. ft. of incoming duct air before the mixture is released to the enclosure. By means of this aspirating action, temperature equalization is accomplished well above the occupied zone. Expansion of the supply air in the members of the air diffuser immediately reduces velocities, so that occupied zone air movement of 40 ft. per min. or less may be maintained.

In a typical railroad car having a 60 ft. open space, a double-row installation of the new straight-line diffusers will handle up to 2,400 cu. ft. per min, without draft and with temperature equalization throughout the space.

Long Range Floodlight

The Revere Electric Manufacturing Company, Chicago, has developed a "2,000" line of floodlights for long-range floodlighting applications suitable for railroad yard lighting.

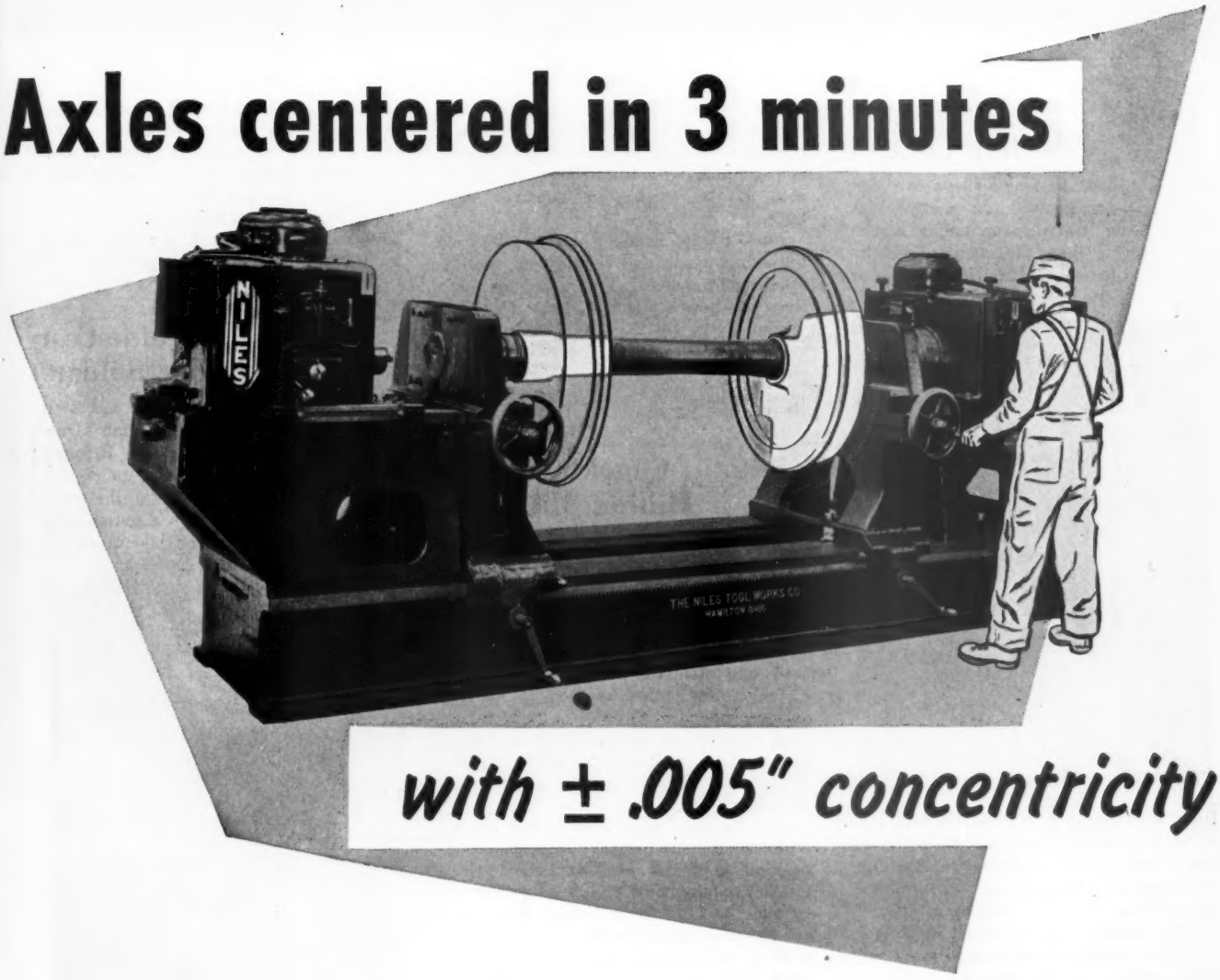
The reflector housing consists of two 14-gauge No. 2S0 aluminum spinnings hinged together by means of a cast ring and clamped tight by means of heavy stainless steel spring latches. The hinge is so made as to hold the rear reflector open while servicing.

There are no chains or loose sections to dangle in the wind and cause reflector damage or lamp breakage. Removal of three screws gives access to the socket housing.

The unit may be used with 750, 1,000 or 1,500-watt PS-S2 clear bulb, mogul base lamps. The lens is made of impact-resisting type glass, sealed into the reflector with a non-hardening cement to provide a permanent water-tight seal.

Rear and front sights provide a means of aligning lamp filament in the axis of the two accurately formed reflectors. The sights permit aiming the floodlight on the exact area which is to be illuminated. A vertical indicator is also provided together with a rotation stop adjustment, so that floodlight can always be brought back to its exact position after cleaning or relamping.

Axles centered in 3 minutes



with ± .005" concentricity

This is the new Niles Hydraulic Centering Machine installed at the Glenwood wheel shops of the B&O.

The Baltimore & Ohio reports that an axle alone, or an axle with wheels mounted on it, can be centered on both ends in three minutes. At this rate, direct savings in labor amount to about 10% per year on the investment.

However, the really big saving results from the accuracy, both in alignment and in concentricity, of the centers. Centers are held to within ± .005 inches of concentricity with collars, journals or wheel seats. With such near-perfect centers, both an axle and the wheels mounted on it can be turned faster, with less material removed—with longer life and with far better balance of the mounted wheel set. Further, these savings in turning will be realized again and again as axles now going through the shop return for wheel attention later.

This Niles Hydraulic Centering Machine is designed to cut costs and improve quality of output of major wheel shops. It is a fitting companion to the Niles profiling attachment for car-wheel lathes, since, without accurate centers in axles, highly accurate concentricities in wheel treads are impossible.

With this machine, axles are chucked on collars, journals or, if unmounted, on wheel seats. Operation from that point on is fully automatic—traverse of both heads, boring to uniform depth, and return traverse.

Machine can also be used to check concentricity of journals and wheel treads. It will accommodate axles with inside or outside journals up to 6½" dia. (up to 12" if special chucking jaws are ordered), and mounted wheel sets up to 57" dia. It is powered by two 3-hp motors, utilizes hydraulic feed, and is completely self-lubricated.

For further information, call the Lima-Hamilton sales offices in New York or Chicago, representatives in other cities, or write directly to Lima-Hamilton Corporation, Hamilton, Ohio.

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DIVISIONS: *Hamilton, Ohio*—Niles Tool Works Co.; Hooven Owens, Rentschler Co. *Lima, Ohio*—Lima Locomotive Works Division; Lima Shovel and Crane Division.

PRINCIPAL PRODUCTS: Niles heavy machine tools; Hamilton diesel and steam engines; Hamilton heavy metal stamping presses; Hamilton-Kruse automatic can-making machinery; Locomotives; Cranes and shovels; Special heavy machinery; Heavy iron castings; Weldments.

Resistance Welding Control

A single-phase to single-phase low frequency electronic welding control that has a lower kva. demand and a higher power factor than the standard single-phase to single-phase control is available

from Westinghouse Electric Corporation. It makes possible welding of scaly or rusty steel with a minimum of spitting from the electrodes and also can be used for welding brass or aluminum.

This control is a frequency converter which, by means of electronic tubes, converts current at line frequency to current at lower frequency. The complete unit consists of three basic components: 1—a sequence panel which coordinates electrical functions of the control with the mechanical functions of the welder; 2—a frequency control circuit which transforms line frequency into a lower frequency; and 3—a weld timer which times duration of the welding current.

The control is designed for connection to a resistance welding machine having a specially constructed transformer with a center tapped primary. Operation of the control is such that current is passed in one direction through the primary for four half-cycles, stopped and then reversed for four half-cycles, thus producing a low frequency alternating current on the output side of the transformer. The electronic circuits accurately control the duration of each of these one-half cycles.

Fuel-Oil Treatment

National Aluminate Corporation, 6200 West sixty-Sixth place, Chicago 38, has announced the availability of a new fuel-oil treatment for use in oil-fired locomotives and boiler furnaces. The product, called Nalco SR-155, is formulated to prevent sludge formation in storage tanks, eliminate fouling of fuel-oil preheaters, stop gumming at burner tips, and remove soot in the combustion chamber and flues.

Nalco SR-155 is added to the fuel oil in the storage tank and requires no special feeding equipment. Testing in locomotives and power plants indicates that the use of Nalco SR-155 can result in substantial time and fuel savings where sludge, gumming or soot conditions are present.

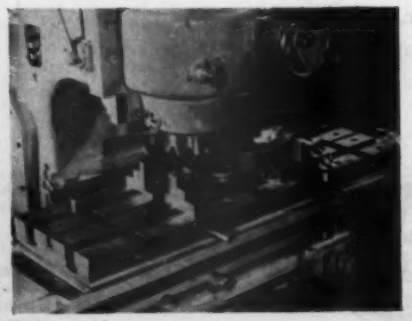
Chucking Table Milling Machines

The milling machine development, illustrated, is intended to facilitate the handling of irregularly shaped workpieces, without resorting to costly tooling and fixtures. The design of the table is such that with certain simplified vise jaws and standard setup accessories, a chucking mechanism is used to handle various shaped workpieces with a minimum of time for setup. The unit is one of a new line of knee type millers manufactured by Kearney & Trecker Corp., Milwaukee, Wis.

The chucking table, cast in one piece, is precision made throughout for accurate positioning of jaw bases and accessories to meet requirements of any setup. Twenty-four chucking table milling machines are available in plain or vertical styles, with or without automatic cycle monolever table control, in two sizes—No. 4 and No. 5, having 42-in. and 50-in. power table travel, respectively. Power capacities range from 20 hp. to 50 hp.

Chucking table accessories include the master jaw bases, consisting of two T-nut units connected by a right- and left-hand screw, the end of which is squared to take a crank handle. These master jaw bases fit both the longitudinal and transverse table T-slots. Three types of vise jaws are offered. These are mounted on the master jaw bases to form the chucking mechanism. They include smooth universal reversible jaws, serrated universal reversible jaws and vise jaw blanks.

In addition to the various types of universal vise jaws, other work-holding and locating accessories are available. These include an adjustable spring loaded screw jack and a plain screw jack for mounting in the large transverse and longitudinal table T-slots, and a smaller plain screw jack for use in the small longitudinal table T-slot. Bumper stops for end location are also offered. A crank handle for moving the vise jaws is provided.



Machine-Cast Bar Solders

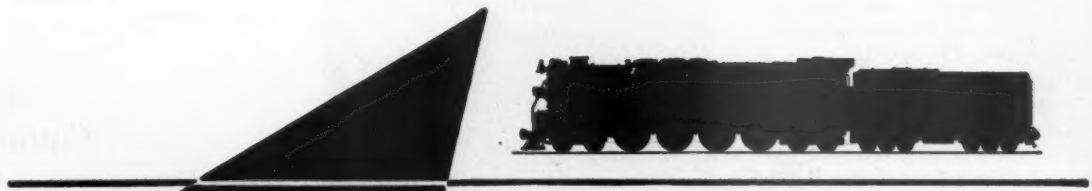
A new type tin-lead bar solder has been announced by Federated Metals Division, American Smelting and Refining Company, New York. Sold under the trademark name of Castomatic, the product is being introduced on a nation-wide basis after five years of laboratory research and pilot plant development.

Castomatic solders are manufactured

by casting machines which operate on the die casting principle. For generations, it has been the accepted procedure in the metal-working industry to cast solder bars by hand. Although universally accepted, these bars leave much to be desired. The new equipment, the manufacturer states, eliminates the deficiencies of manual casting, and produces a solder which has proved superior in over two years of field tests. Some industrial users have reported that the new solders acted as though they contained a higher tin content than specified.

With the machine process, shown in the illustration, the molten solder is contained in a completely closed system from melting kettle to mold. All operations are fully automatic, and each step in the manufacturing cycle is timed to fractions of a second by electronic controls.

Oxides in the metal are eliminated because the system is closed to air during melting and casting. As a result, Castomatic solders have improved fluidity, easier working properties, and uniformity of composition.



Let's be power-thrifty

For years to come some railroads will have steam locomotives. And it is merely business thrift to endeavor to get the most efficient operation possible from such motive power.

In many instances the installation of Security Circulators in existing steam locomotives will prove a profitable investment. Originally developed by American Arch as a support for Security arch brick, road experience has shown that Security Circulators greatly improve steaming performance and aid in many other ways in increasing motive power efficiency.

* * *

For nearly forty years the American Arch Company has been designing and furnishing arch brick for coal-burning locomotives, and a recent development is the Security Dutch Oven for improving combustion in oil-burning steam locomotives.

American Arch Company Inc.

NEW YORK • CHICAGO

Detachable Connections For Paint Spray Hose

A practical quick-detachable connection that will shut off fluids under pressure when the hose connection is broken and instantly restore the flow when the connection is re-established, has been developed by the Binks Manufacturing Co., 3122 Carroll ave., Chicago 12.

Using a bayonet-type joint, the connection can be made or broken, almost instantly, with a slight turn of the wrist. No time is lost matching threaded connections or tightening couplings. It provides the advantage of being able to quickly disconnect the hose from a spray gun, material tank or another length of

hose. There are no washers or gaskets to lose, leak or wear out.

The quick-detachable material connection is a companion product to their quick-detachable air connection, which applies a similar principle to the air supply line.

Both products are made in standard air and material hose sizes, with standard threads to fit all Binks fittings, spray guns and spray painting equipment.

Cam and Lever Actuated Shear

An improved type of cam and lever actuated shear that cuts off flat strip stock with punch and die authority is announced by The DoAll Co., Des Plaines, Ill.

The shear is designed for cutting off bandsaw blades square and flat in preparation for welding into bands. It will take blades up to 0.045 in. thick and 1¼ in. width.

The quick cutting by the pivoted shear decending between two knife edge blades as the strip of material is accurately positioned by a squaring plate eliminates any deformity of material at the cut.

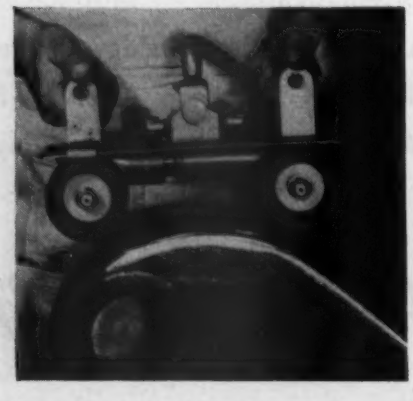
A piece of blade ⅛ in. wide is removed so that an old weld can be cut out and at the same time the blade ends are squared in preparation for a new weld. No further grinding is required to square or flatten down turned up ends for welding.

The new blade shear has a wide shearing surface and stays sharp longer, it produces a smoother cut than is produced by snips. It has the added advantage of staying put since it can be mounted on the saw or permanently wall or bench mounted in convenient location. The three hardened shear blades are easy to remove and grind sharp on a bench or surface grinder.

The shear is a time saving accessory that is designed for the bandsaw operator or the tool crib that dispenses bandsaw blades prepared for immediate welding. It will also find uses wherever flat, smooth, square cut edges are desired. The shear's action will appeal to operators engaged in salvaging metal strapping and baling ties, joining wire and coil stock for punch press roll feeds, etc., where strength and continuous production depend on strong welds.

Air-Driven Belt Sander

An air-driven belt sander, adaptable for metal work on all types of surfaces, whether concave or convex, has been announced by Buckeye Tools Corp., 21 W. Apple st., Dayton 1, Ohio.



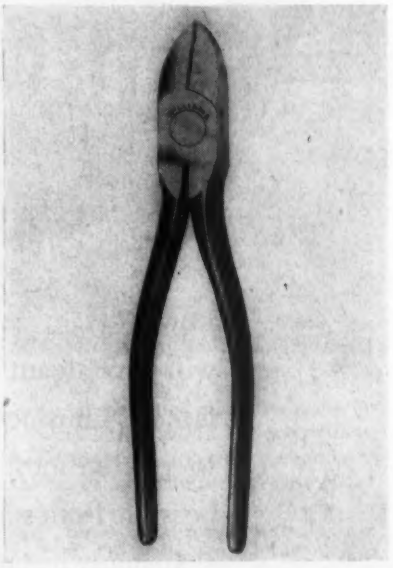
This addition to the Stream-Power line of portable air tools, is applicable to all types of metal finishes, both sheet metal and solid castings and to all types of materials in iron, steel, brass, bronze, solder, aluminum and magnesium. It is also suitable for finishing and sanding wood products.

Diagonal Cutting Pliers

Diagonal cutting pliers in 6 and 7 in. sizes have been announced as the first of a new line to be manufactured by J. H. Williams & Co., 400 Vulcan st., Buffalo, 7, N. Y.

Special high carbon steel is used in drop-forging these pliers. In addition to hardening and tempering, the jaws receive a second hardening by electronically controlled heat-treatment.

The cutting edges are machined and



hand sharpened. A large diameter rivet assure smooth action without distortion, even when cutting heavy wire.

The pliers are finished with a lustre-black protective finish with the faces and edges of the jaws polished bright.

Chain Hoists

A line of Auto-Bloc light-weight, heavy-duty hoists featuring a simplified hoisting mechanism which has only two gears has been announced by David Round & Son, Cleveland, Ohio. The gears are a cam-actuated floating inner gear and an outer gear to which the load sheave is rigidly connected. Each pull on the hand chain causes the cam shaft to revolve, actuating the floating inner gear. The inner

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FOR TRAIN HEATING
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gear moves eccentrically over the inner circumference of the outer gear. But, held in one position relatively by eight hardened steel balls, it cannot rotate. It thus compels movement of the outer gear and load sheave.

The gears are special alloy steel, cut, hardened and ground. The cover is drop-forged from chrome manganese steel with a tensile strength of 200,000 lb. per sq. in. The Auto-Blocks are available in 16 standard models of ½- to 40-ton capacity, each factory tested for 50 per cent overload.

Air-Powered Vertical Sander

A lightweight vertical sander, model 7025, designed for performance at speeds adjustable to 5,000 r.p.m., is announced by The Aro Equipment Corp., Bryan, Ohio. The tool is furnished with a choice of a

7 in. backing pad, a 4 in. cup grinding wheel with guard, or a 4 in. wire brush.

This sander is completely streamlined in design, having a magnesium housing for lightness and toughness. It weighs 5 lb. without sanding pad. The height to the end of the spindle is 8½ in.

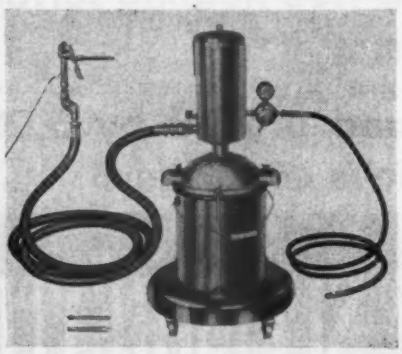
Speeds can be adjusted by manipulating a throttle control. Improved handle design forms the correct angle in relation to motor housing, which gives the tool proper balance for easy handling. An exhaust deflects and cools the sanding pad during operation of the tool. The sander also has a safety throttle, designed to eliminate quick starts and stops, and reduce tool and pad inertia.

Other features include governor-controlled operation, built-in oiler, full bearing support throughtout, and helical gears. The air outlet has a ⅜ in. opening.

Air Operated Portable Pump

Material can be applied directly to the work surface from this one-man operated pump or transferred to hand guns. An air compressor, capable of delivering 5 cubic feet of air per minute at a minimum of 150 lb. pressure, will operate the pump.

This heavy duty, air-operated Powerflo



Pump, for pumping industrial fluids and semi-fluids from original 5-gal. containers, is manufactured by Gray Company, Inc., Minneapolis, Minn. A special feature is a new type follower plate which utilizes the weight of the pump to insure positive priming at all times.

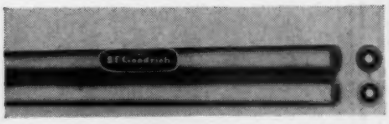
The pump handles gun-grade calking compounds, gun-grade putty, semi-fluid adhesives, sealers, and other industrial materials of similar consistency. The pump has a pressure ratio of 4½ to 1, with a double-acting piston to assure continuous flow of material.

A 15-ft. material hose with an inside diameter of ¾ in. terminates in a full-capacity flow gun with jumbo-size universal swivel. Three interchangeable nozzles are furnished for the flow gun. A 25-ft. air supply hose with airline coupler and an air pressure regulator and gauge are also included. Constant flushing of inner material cylinder is possible by means of a built-in solvent cup. Hold-down rods bolt pump and pail cover in position. Easy portability is achieved by a sturdy dolly base with 4 removable casters.

Oxy-Acetylene Welding Hose

A twin oxy-acetylene hose in which two lengths, one red and the other green, are joined by a thin strip of rubber has been announced by the B. F. Goodrich Company, Akron, Ohio. The hose is marketed under the brand name Duo-Weld.

Its molded finish cover is smooth and the tube is exceptionally smooth and uniform. Reinforcement consists of one braid of high tensile hawser cord cotton yarn which in the ¼-in. size gives strength



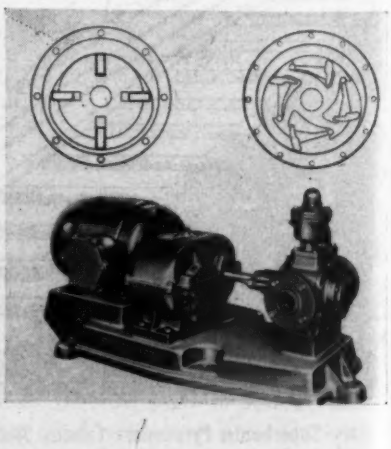
comparable to the standard two braid single line construction.

The rubber strip joining the two hose lengths is of high quality rubber stock with extreme flexibility. The strip also allows the hose to be separated into single lengths, when that is desirable, without tearing into the cover of either length.

Duo-Weld hose is being made in 50-, 25- and 12½-ft. lengths, with the ¼-in. size being stocked. Each length is separated approximately 18 in. from each end and is secured with a metal ferrule at the separation point.

Sliding Vane Rotary Pumps

Gasoline and other volatile liquids can be pumped efficiently and at higher lifts with the new sliding vane pump, it is



4,000,000 Miles Each!

ON the CB&Q, *four* General Motors Diesel passenger locomotive units (9906-A, 9906-B, 9907-A and 9907-B) have rolled up the impressive total of more than *sixteen million* miles—an average of over 4,000,000 miles each—a record we believe is unsurpassed by any other self-propelled vehicle of land transportation. Total miles operated by these four veterans average 91.2% of miles assigned. Twenty-two other Burlington units have already passed the million-mile mark of which two have covered more than three million miles, and fourteen, more than two million miles apiece. Availability for the Burlington's entire GM Diesel passenger fleet is 95.4% with a grand total of 90,000,000 miles operated.

GENERAL MOTORS LOCOMOTIVES — ELECTRO-MOTIVE

DIVISION OF GENERAL MOTORS

LA GRANGE, ILL.

Home of the Diesel Locomotive

claimed. Extremely viscous liquids up to 100,000 SSU are said to be successfully pumped with the unit announced by the Blackmer Pump Company, Grand Rapids, Mich. Vanes are positively actuated by push rods through the rotor and shaft.

They can be furnished in a sound-deadening, nonmetallic material in most instances, which are claimed to be relatively more quiet and wear resistant than conventional metal vanes.

Both sliding vanes, and swinging vanes, also made by Blackmer are said to be self-adjusting for wear and are replaceable without disturbing piping or drive. Swinging vanes are recommended over sliding vanes for certain non-volatile materials and for liquids containing solids and abrasive matter.

Insulation Resistance Tester

A portable insulation resistance tester is now being made by Holtzer-Cabot, Inc., Boston, Mass. It has a testing range from 0 to 100 megohms which covers practically all insulation resistance requirements normally encountered in installation and maintenance of electrical and electronic equipment.

There are no batteries, and no external power supply is required. The tester operates by turning a small hand crank in either direction at a moderate speed to actuate a compact a.c. brushless type generator. A uniform testing voltage of approximately 500 volts d.c. is assured over a wide range of cranking speeds by electronic control. Readily visible red indicator lights tell when correct testing voltage is being delivered, and a guard circuit has been built into the unit to eliminate surface leakage from affecting measurements.

The weight of the tester is 3 lb., and it measures 3⅜ in. wide x 6 in. long x 3¼ in. high. It is housed in a protective die cast aluminum case. Two Neoprene covered lead wires, ten feet long and coded red and black, are supplied with alligator type clips. A strap leather carrying case is included, in which there is space for the tester, lead wires and an instruction booklet.

Soft Plastic Jaws For Chucks

Because the common lathe practice of holding work in soft-steel jaws is not always satisfactory, the Gisholt Machine Company, Madison 3, Wis., has developed a new lightweight plastic soft jaw blank. The primary purpose of the plastic jaws is to eliminate marring machined surfaces or distorting tubing or other thin wall parts.

The jaw is a molded, phenolic type of plastic. It can be machined to size with the same feeds and speeds as used for brass. The jaw has two to two and one-half times the gripping power of soft steel under the same chucking pressure. It can be used for either first or second operation work and it is recommended by the manufacturer for cast iron, aluminum, brass or any other material that does not require coolant during machining.

Lighting Fixture Hangers

The Thompson Electric Company, Cleveland, Ohio, has announced the modification of its complete line of disconnecting and lowering hangers to incorporate a heat-treated aluminum alloy casting for the positioning stem and a re-designed, stronger guide tube. The new aluminum alloy stem, a permanent mold casting, provides greater strength at less weight than the formerly used malleable iron casting and is more resistant to corrosive atmospheres and extreme weathering. It is anodized to meet Army Air Force specifications and to withstand more than 100 hours of salt spray test.

This new positioning stem also features a multiple rib design which allows accurate forming of the diameter to within 0.001-in., decreases the metal to metal contact, and reduces the clearance required between the stem and guide.

The slotted guide tube has been reinforced throughout and provided with a larger bearing surface for greater strength and to assure safe support of heavy lighting fixtures in all types of installations, including outdoor floodlights subject to high wind pressures and indoor lights subject to constant vibrations or hard shocks.

A remotely-controlled, latching type, overhead, disconnecting switch combined with a fixture lowering and raising device, the Thompson hanger provides for low-cost, safe maintenance by lowering overhead lights to floor level for cleaning lamp replacement, or repair.

Diesel Fuel Oil Dehydrator

The Erie Dehydrator is designed both to filter and to remove water from petroleum products. It comprises a horizontal circular tank with the oil inlet at the top of one end and the outlet at the top of the other end. Between the two is the separating medium bordered on each end by the filter pack retainers, which include 80-mesh screening. Below the outlet end is a sump which collects the water removed from the oil and which has an exterior glass gauge to indicate the amount accumulated.

Standard units are designed for 50 lb. per sq. in. working pressure, 75 lb. per sq. in. test, and are available in capacities from 25 to 300 gal. per min., based on gasoline. There will be some variation in capacity dependent on viscosity when used with other fuels.

There are several means available for removing the water which accumulates in the sump, either manually or automatically. There are also two arrangements, one hydraulic, the other electrically operated, for closing down the system if a greater amount of water should be introduce than can be expelled normally from the sump. Electric blankets may be furnished which will prevent water freezing in the sump and insure operation in sub-freezing temperatures.

The dehydrators are available from the Erie Meter Systems, Inc., Erie, Pa., in six capacities—25, 50, 80, 100, 200 and 300 gal. per min. based on gasoline.

Lower Diesel Maintenance Costs

Engines stay cleaner when lubricated with Texaco Dieseltex HD

YOU'RE not "experimenting" when you turn to *Texaco Dieseltex HD*. This fine railroad Diesel lubricating oil has proved its worth in service on the rails. It has more than enough of what it takes to meet the stiffest requirements of leading Diesel locomotive builders.

Texaco Dieseltex HD keeps engines cleaner, better protected and more efficient because it has high detergent-dispersive characteristics, plus an exclusive formula containing a special heavy-duty additive that gives exceptional resistance to oxidation and sludge formation.

Let a Texaco Lubrication Engineer show you how *Texaco Dieseltex HD* is increasing efficiency and economy for other railroads. Ask him to tell you about Texaco's Systematic Engineering Service. Just call the nearest Railway Sales Division office listed below, or write The Texas Company, *Railway Sales Division,* 135 East 42nd Street, New York 17, N. Y.

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TOLEDO, PEORIA & WESTERN RAILROAD — "Best East to West" — keeps these two 1500 h.p. Alco Road Switchers busy around the clock. They average 12,000 miles monthly. Both units are lubricated with *Texaco Dieseltex HD* exclusively.

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NEWS

Davidson Heads Bureau Locomotive Inspection

EDWARD H. DAVIDSON on June 28 took his oath of office as director of the Bureau of Locomotive Inspection of the Interstate Commerce Commission. His appointment, which President Truman sent to the Senate on June 6, was unanimously confirmed by that body on June 23. It had been reported favorably on the previous day by the Senate committee on interstate and foreign commerce, which at the same time deferred action on the President's nomination of James E. Friend, a district inspector of the bureau, for the assistant directorship made vacant by the promotion of Mr. Davidson.

E. H. Davidson

In assuming the directorship, Mr. Davidson became the successor of John M. Hall, whose retirement on May 31 was reported in the July issue.

The new director was born September 26, 1882, at Monroe, Conn. He attended the public schools at Baraboo, Wis. His first employment was with the Chicago & North Western as an engine wiper. He was subsequently employed by the Baltimore & Ohio as machinist at Garrett, Ind., and by the Central of New Jersey in various capacities, including those of machinist, engineman, and enginehouse foreman.

Mr. Davidson left railroad service to become master mechanic for the Milliken Bros. Steel Corporation, but returned for approximately two years of service as a locomotive engineer on the Southern. When the Panama Canal was under construction, he was associated for 6½ years with the Transportation Department of the Panama Canal Commission. Mr. Davidson has been with the Bureau of Locomotive Inspection continuously since October 23, 1914, when he joined the staff as a district inspector. On May 16, 1940, he became assistant chief inspector by appointment of the late President Roosevelt. The title of assistant chief inspector was subsequently changed to assistant director. Mr. Davidson is a member of the Brotherhood of Locomotive Engineers and the American Society of Mechanical Engineers, and an honorary member of the Master Boiler Makers Association.

Industrial Fasteners Institute

THE American Institute of Bolt, Nut and Rivet Manufacturers, Cleveland, Ohio, has changed its name to the Industrial Fasteners Institute.

Miscellaneous Publications

ALUMINUM STRUCTURAL DESIGN.—Published by Reynolds Metals Company, 2500 South Third street, Louisville 1, Ky. 124 pages, 5¾ in. by 8¾ in., illustrated. Wire bound. For designers, engineers, architects, etc., who request it on company letterhead. The purpose of the book is to enable the engineer familiar with mechanics of materials to design an original structure of aluminum, or to convert an existing structural design from some other material to aluminum. It contains chapters on figuring tensile stresses, compressive, bending, and shear stresses, as well as stresses in cylinder subjected to fluid pressure.

A section is devoted to fabricating considerations and joining methods—riveting, bolting, fusion welding, and spot welding. Additional chapters cover deflection and vibration problems. There are 63 tabulations of physical, chemical, and mechanical properties, etc.

ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE JULY ISSUE

LOCOMOTIVE ORDERS

Road	*No. of locos.*	*Type of loco.*	*Builder*
Chesapeake & Ohio	60[1]	1,000-hp. Diesel-elec. road switch. units	Electro-Motive
	20[1]	1,500-hp. Diesel-elec. road switch. units	Electro-Motive
	2[1]	3-unit 3,000-hp. Diesel-elec. switchers	
	58[1]	1,000-hp. Diesel-elec. switch. units	American Loco.
	2[1]	1,500-hp. Diesel-elec. switch. units	American Loco.
Erie	1	1,000-hp. Diesel-elec. switch.	Baldwin Loco.
	6	1,500-hp. Diesel-elec. road switch. units	Baldwin Loco.
Richmond, Fredericksburg & Potomac	5[3]	2-unit 4,500-hp. Diesel-elec. pass.	Electro-Motive
	5[3]	4-unit 6,000-hp. Diesel-elec. frt.	Electro-Motive
Southern Pacific	28[2]	4-unit 6,000-hp. Diesel-elec. frt.	Electro-Motive
	1[2]	2,250-hp. Diesel-elec. pass. unit	Electro-Motive
	17[2]	1,500-hp. Diesel-elec. road switch.	Baldwin Loco.
	22[2]	1,000-hp. Diesel-elec. switch.	American Loco.
Spokane International	9	1,000-hp. Diesel-elec. road switch.	American Loco.
Union	5	1,000-hp. Diesel-elec. road switch.	Baldwin Loco.

FREIGHT-CAR ORDERS

Road	*No. of cars*	*Type of car*	*Builder*
New York, Chicago & St. Louis	200[4]	50-ton box	American Car & Fdry.

[1] One hundred forty of these locomotives were reported in the July issue. The two three-unit, 3,000-hp. locomotives, not reported in July, are for the Chesapeake district. The major portion of these Diesels will be delivered this year, the remainder, early in 1950.

[2] Delivery of passenger locomotives expected to begin in November or December; delivery of freight locomotives to begin in December.

[3] Deliveries to begin next October.

[4] For delivery during fourth quarter of 1949.

NOTES:

Atlantic Coast Line.—The A. C. L. has received the first of 42 new lightweight stainless-steel all-room sleeping cars which are part of an order for 74 stainless-steel cars placed with the car builders in June, 1946.

New York Central.—A new observation lounge car has been added to each of the twin "Ohio State Limited," completing deliveries of postwar passenger equipment for the overnight Cincinnati, Ohio-New York trains.

Pennsylvania.—Twenty modernized air-conditioned coaches and a number of other air-conditioned cars rebuilt at Altoona, Pa., have been assigned to Pennsylvania-Reading Seashore Line Trains.

Union Pacific.—Coincident with the beginning of summer vacation travel, the Union Pacific has placed in transcontinental service 17 new diners and 16 new lounge cars.

Railroad passengers and railroad maintenance men alike can appreciate the effectiveness of ***Wyandotte Raltec.*** This specialized compound not only leaves coaches clean and inviting—it also does its work safely and economically.

Raltec is designed especially for the maintenance cleaning of railroad coaches, baggage cars and other equipment with painted, enameled, and lacquered surfaces. Repeated laboratory and field tests have shown it to be safe on these surfaces, as well as on workers' hands, brushes and clothing. Its superior wetting and cleansing properties speed the removal of traffic soils and bring out the full luster of the finish.

Wyandotte Raltec is used alone to the satisfaction of many customers. However, to assure maximum surface life, it is recommended that the Raltec solution spray be followed by brush application of a Wyandotte C-12 solution. This prevents corrosion, increases brush life and provides a superior cleaning job.

Your Wyandotte Representative will be glad to demonstrate the advantages of these and other Wyandotte Products at your convenience.

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RUB-BUB*

RAILROAD SAFETY FLOORING

Outlasts steel! Reduces pay accidents!
Used by 7 Class 1 roads!

RUB-BUB SAFETY AISLE TREAD (Dri-Foot rib design) and Rub-Bub Safety Underseat Flooring (Dri-Foot knob design) are both made of a full 3/16 inch thickness of sinewy Rub-Bub synthetic compound with integral fabric backing. Microphotograph (enlarged 30 diameters) shows dense, fibrous texture of Rub-Bub compound that's never slippery *wet or dry.*

CHOICE of day coach flooring is no trivial matter. That's why it will pay you — in fewer accident claims and lower maintenance costs — to specify RUB-BUB railroad safety flooring.

Its toothy texture is as safe *after years of service* as the day installed. Wide grooves in the aisle tread drain water *faster* . . . squeegee ribs grip shoe soles *tighter.* Knob design of underseat flooring keeps feet high and dry.

And with RUB-BUB flooring there's no costly replacement resulting from premature wear. Tough RUB-BUB synthetic rubber compound lasts for years with no sign of wear. Abrasive dirt accumulates in deep grooves *below* contact surfaces . . . integral fabric backing prevents excessive "growth."

Exclusive Dri-Foot design is also a feature of RUB-BUB vestibule plate, step plate and white safety step edge. Installed throughout a day coach, they make an ideally matched installation—for improved appearance . . . greater safety . . . longer life. Write for a RUB-BUB sample and see for yourself why it is *the big value in railroad flooring.*

SOME TERRITORIES STILL AVAILABLE FOR ESTABLISHED AGENTS

STEP PLATE WITH WHITE SAFETY EDGE
ALL-BLACK STEP PLATE. BOTH STEP PLATES HAVE NATURAL RUBBER EDGE, SYNTHETIC RUBBER TREAD.
VESTIBULE PLATE

RUB-BUB
Transportation Products

SAMUEL MOORE & CO. MANTUA, OHIO

IN CANADA | RAILWAY & POWER ENG. CORP.
Montreal • Hamilton • Windsor
Toronto • North Bay • Winnipeg
Vancouver • Noranda • New Glasgow

*T. M. REG. U.S. PAT. OFF. A-2018

Frederic A. Schaff Honored by Purdue

FREDERIC A. SCHAFF, chairman of the board of Combustion Engineering-Superheater, Inc., was honored by Purdue University, his alma mater, with the degree of Doctor of Engineering at the school's ninety-first commencement on June 19. The presentation was made by Dean A. A. Potter in recognition of Mr. Schaff's "contributions to the design and production of equipment harnessing power for the benefit of mankind."

SUPPLY TRADE NOTES

BINKS MANUFACTURING COMPANY.—Classes in spray-painting methods and equipment are being held during the first full week of each month, except July and December, at the Spray Painting Equipment School recently opened by the Binks Manufacturing Company at Chicago. Information concerning the classes can be obtained from E. F. Watts of the Binks Company at 3122 Carroll avenue, Chicago 12.

◆

MORTON MANUFACTURING COMPANY.—The *O. K. Company,* 80 Jackson boulevard, Chicago, has been appointed representative for the Morton Manufacturing Company, 5195 West Lake Street, Chicago. Associated with O. K. are *Tom King,* president; *Karl V. Graff,* vice-president, and *Mal Cone,* salesman.

Oren G. Rutemiller has been appointed chief engineer of the Morton Company, and H. A. Osborne, manager of the company's welding fixture division.

◆

OXWELD RAILROAD SERVICE COMPANY.—*Frank C. Hasse,* vice-president, mechanical department, of the Oxweld Railroad Service Company, a unit of Union Carbide & Carbon Corp., at Chicago, retired on July 1. *Lem Adams,* also vice-president at Chicago, has assumed general supervision of the mechanical and construction departments in addition to his present duties. *Clarence R. Strutz* has been promoted to manager of the mechanical department.

◆

AMERICAN STEEL & WIRE CO.—The American Steel & Wire Co. (a subsidiary of the United States Steel Corporation), on June 23, officially opened its recently completed stainless steel wire producing mill at Waukegan, Ill., which has a capacity of 500 tons a month. Nearly 1,000 guests attended the dedication ceremonies and visited the plant facilities

covering 100,000 sq. ft. Equipped with newly designed machinery and employing new production techniques developed since the war, the new mill will be one of the largest single stainless-steel wire producers in the world.

◆

AMERICAN CAR & FOUNDRY CO.—*Henry V. Bootes,* assistant vice-president of the American Car & Foundry Co. since September, 1948, as announced on Page 599 of the October issue, has been elected vice-president in the sales department, with headquarters as before at New York.

◆

CLIMAX-MOLYBDENUM COMPANY.—*Arthur H. Bunker* has been elected president of the Climax-Molybdenum Company.

Mr. Bunker, who resigned as a general partner of Lehman Brothers on June 30, was founder and first president of the United States Vanadium Corporation. His career has included also the presidency of the Carib Syndicate, Ltd., and the Colon Oil Corporation.

◆

N. A. STRAND COMPANY DIVISION OF BALMAR CORPORATION.—The Balmar Corporation of Baltimore, Md., has acquired the business of N. A. Strand & Co., 5001 North Wolcott avenue, Chicago, which now manufactures the Strandflex line of flexible shaft machine tools under the name N. A. Strand Company Division

(*Continued on page 477*)

Supply Company Executives Honored by France

FIVE executives of companies manufacturing railroad equipment and supplies have been honored by France with presentations of the Legion of Honor. They are *J. E. Dixon,* president of the Lima-Hamilton Corporation; *A. M. Hamilton,* vice-president of the American Locomotive Company; *R. A. Williams,* president of the Standard Railway Equipment Manufacturing Company; *Ralph Kelly,* former president of the Baldwin Locomotive Works, and *G. R. Carr,* chairman of the board of the Dearborn Chemical Company. Henri Bonnet, French Ambassador to the United States, presented the Legion's insignias and diplomas to Messrs. Dixon, Hamilton, and Williams at a recent dinner in Washington, D. C., where like awards were also made to *J. W. Marsh,* a consulting engineer. The presentation to Mr. Carr, who was among the guests at the Washington dinner, had been made previously while he was on a trip to France. The presentation to Mr. Kelly, who was abroad at the time of the dinner, will be made this month by C. Bruneau, chief of the French National Railroads Mission in the United States. In making the presentations, Ambassador Bonnet said they were a token of France's gratitude to those who have contributed to the delivery of railroad rolling stock to that country. The promptness of the deliveries and the quality of the equipment greatly expedited the rehabilitation of French railroads, he added.

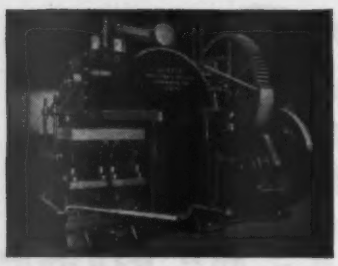
Extra Speed

THREADING 1" to 2" PIPE

RIDGID No. 65R
is semi-automatic, sets to pipe size in just 10 seconds

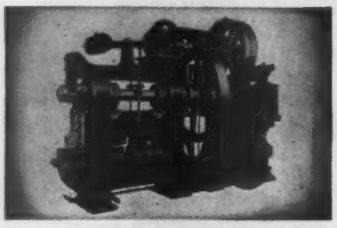
● The RIDGID 65R is so handy and efficient that it's actually a pleasure to use. In just 10 seconds you're ready to cut perfect threads on 1," 1¼," 1½" or 2" pipe. Workholder sets instantly—only one screw to tighten, no bushings. With the self-contained RIDGID 65R you don't have to bother with extra dies—one set of high-speed steel chaser dies gives you accurate threads on any kind of pipe or conduit, always—easily. Every 65R is factory-tested. Buy from your Supply House.

RIDGID
WORK-SAVER PIPE TOOLS
THE RIDGE TOOL CO. • ELYRIA, OHIO



BEATTY No. 11-B Heavy Duty Punch widely used in railroad industry.

BEATTY combination Press Brake & Flanger does flanging, V-bending, pressing, forming, straightening.



BEATTY CoPunShear, one unit does coping, punching, shearing.

BEATTY Hydraulic Vertical Bulldozer for heavy forming and pressing.

BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging, bending.

we're WISE TO A LOT OF PRODUCTION PROBLEMS

BEATTY-*engineered* heavy metal working equipment is on the job in hundreds of important plants, doing a wide variety of jobs. Yet, each machine is individually engineered to do its specific task better, faster, at less cost. This wide range of experience is your assurance of expert counsel, advanced engineering, finest quality construction. There's a better way to handle any heavy metal fabricating problem. Our job is to help you find that better way. If you have a problem, write us. We may have the answer.

HYDRAULIC HEAVY METAL WORKING EQUIPMENT

BEATTY MACHINE AND MFG. COMPANY HAMMOND, INDIANA

of the Balmar Corporation. The latter is a subsidiary of the Franklin Railway Supply Company, New York.

◆

INTERNATIONAL STEEL COMPANY.—*Frank E. Cheshire*, formerly vice-president of the Chicago, Indianapolis & Louisville and, more recently, transportation engineer, General American Transportation Corporation, Chicago, has become manager of sales for the recently created railway division of the International Steel Company, Evansville, Ind.

◆

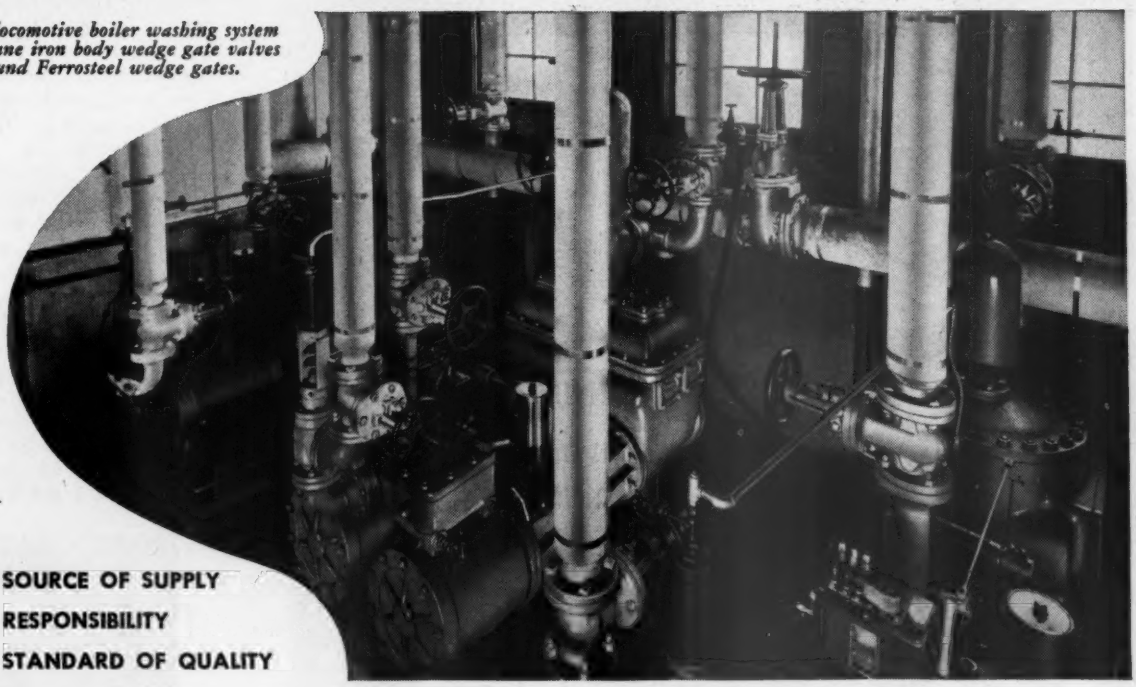
WORTHINGTON PUMP & MACHINERY CORP.—*Hobart C. Ramsey*, formerly executive vice-president of the Worthington Pump & Machinery Corp., has been elected president to succeed *Clarence E. Searle*, who has been named vice-chairman of the board of directors. *Edwin J. Schwanhausser*, vice-president in charge of sales since 1945, has been elected executive vice-president, and *John J. Summersby*, assistant vice-president and general sales manager since 1937, has been elected vice-president in charge of sales.

◆

ELECTRIC SERVICE MANUFACTURING COMPANY.—The following changes in territorial representation have been announced by the Electric Service Manufacturing Company: *Walter Knodle*, formerly at Dayton, Ohio, transferred to take charge of the Detroit, Mich., office, replacing *John Mahler*, resigned; *E. Schoffield* assigned to assist Mr. Knodle; and *Warren Erbe*, formerly of the Philadelphia, Pa., office, transferred to succeed Mr. Knodle at Cincinnati, Ohio.

◆

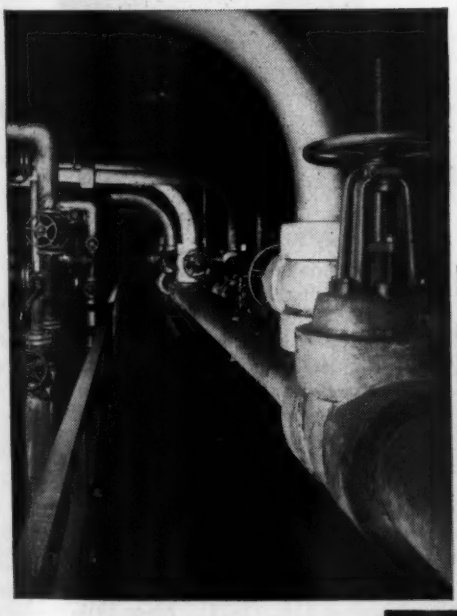
TIMKEN ROLLER BEARING COMPANY.—The Timken Roller Bearing Company commemorated its golden anniversary at Canton, Ohio, June 20-24, by opening its facilities to all who cared to visit and inspect its plants in the Canton area. Special tours were conducted at frequent intervals to show visitors the steps involved in manufacture, testing and inspection of roller bearings and other Timken products. Interspersed among the technical sights were other displays which dramatized the taxes paid by Timken, as compared with what the federal government spends and in terms of the machinery this tax money could buy. The tours began in the main tool room, and continued to the hardening, carburizing and grinding departments. The next steps were the cage stamping department, the bearing assembly department, and the bearing inspection departments. The tour continued from the latter point through the industrial bearing and cup inspection departments. After viewing the shipping department, the visitors then saw the railway display, which featured such recent applications of Timken bearings as those on 50 new 50-ton freight cars for the Great Northern and 40 for the Atchison, Topeka & Santa Fe. The special grinding department was also of particular interest to railway visitors. The bearing manufacture portion of the tour was concluded in the roll gaging and roll grinding departments, after



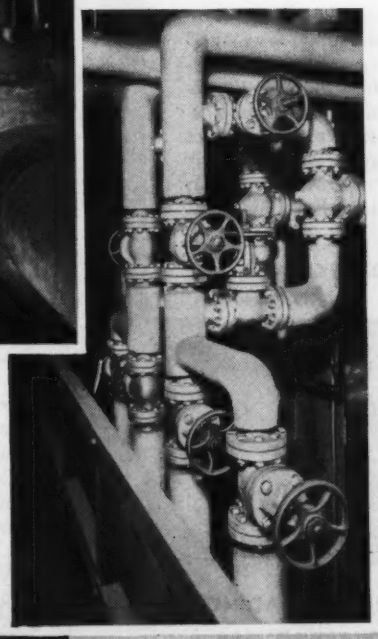
STEAM PUMPS *in locomotive boiler washing system equipped with Crane iron body wedge gate valves and Crane 250-pound Ferrosteel wedge gates.*

ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

Piping equipment for every need ...on one order to CRANE



MAIN STEAM HEADER *and feedwater lines in power plant. Crane supplies all piping equipment for installations of this type.*



FEEDWATER LINES *in railroad terminal power plant—250-pound steel valves are from the complete Crane line.*

When it comes to piping equipment . . . for mobile or stationary units . . . one order to any conveniently located Crane outlet covers everything for the job. Whether you need valves, fittings, pipe or accessories, you can get them at Crane. Get better service, too. For Crane supplies you through a closely co-operating network of local, well-stocked Branches and Wholesalers . . . all backed by large factory stocks.

Many railroads have long standardized on this **Single Source of Supply** to simplify every piping procedure. Giving Crane **Undivided Responsibility** for materials helps to assure better installations, avoids needless delays. **Highest Quality** in every item—a tradition at Crane—makes for efficient, dependable performance throughout piping systems.

CRANE CO., 836 S. Michigan Ave.
Chicago 5, Ill.
Branches and Wholesalers
Serving All Industrial Areas

EVERYTHING FROM . . .

VALVES
FITTINGS
PIPE

CRANE

PLUMBING
AND
HEATING

FOR EVERY PIPING SYSTEM

"And then we'll cover the whole thing with slip-resistant 4-WAY Safety Plate."

Climbing steps, too, is easier—and *safer*—when they are formed of Inland 4-WAY Safety Plate. 4-WAY's raised lug pattern provides firm, *positive* traction. Install it wherever feet or wheels must go, in your plant or on your product. INLAND STEEL CO., 38 S. Dearborn St., Chicago 3, Illinois.

WRITE FOR BOOKLET

STOCKED BY LEADING STEEL WAREHOUSES

Inland 4-WAY SAFETY PLATE

Reg. U. S. Pat. Off.

which the visitors witnessed the manufacture of Timken alloy steel at the Canton Melt Shop, and then boarded buses for the Gambrinus bearing factory, where cups, cones, large rolls and other bearing parts are made. This plant is located a few miles from the main Canton plant and is served by the Timken-owend railroad between the two.

◆

ALUMINUM COMPANY OF AMERICA.—*Gilbert B. Hauser* has been appointed head of the railroad section of the development division of the Aluminum Company of America.

Mr. Hauser, a graduate of Pennsylvania State College in 1923, completed a three-year course as a special apprentice with the Pennsylvania. He later was motive-power inspector for that road at Altoona, Pa., Harrisburg, and New York. He joined

Photo by Gimbel's

Gilbert B. Hauser

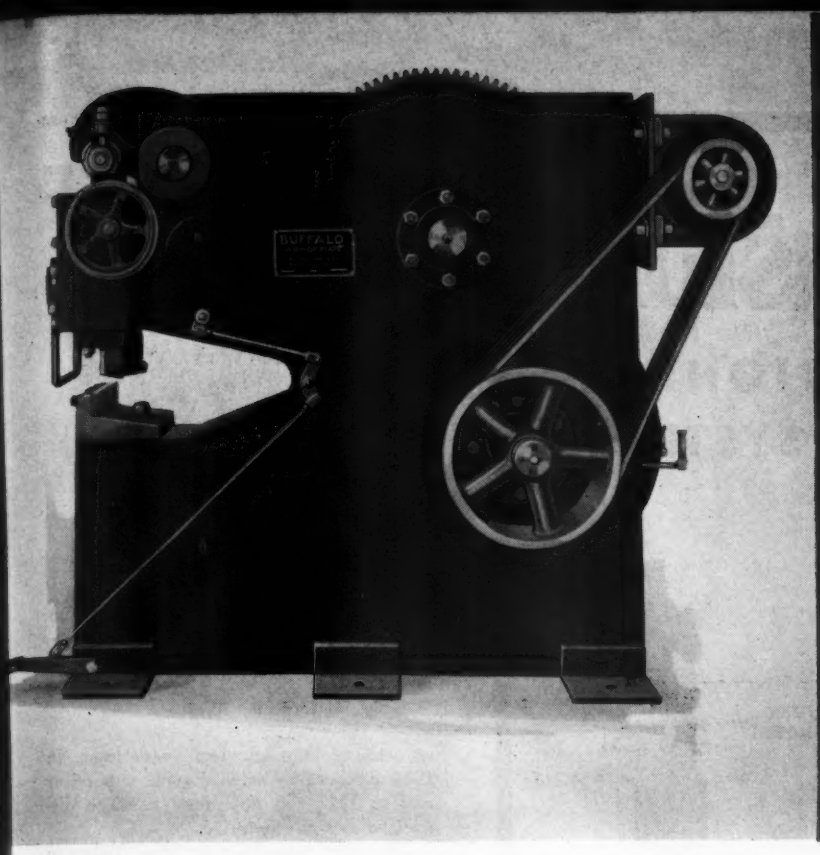
the Aluminum Company of America in 1930. During World War II, he was on loan to the Office of Emergency Coordinator to assist in building new defense plants. He returned to the company in 1944 and was appointed assistant chief engineer of the railroad section, at New Kensington, Pa.

◆

VALVE PILOT CORPORATION.—At a recent meeting of the board of directors, *William W. Battles* was elected president of the Valve Pilot Corporation. Mr. Battles is a graduate of Princeton with the degree of C.E. (1912). Since 1912, with the exception of a period in the first World War during which he served as a major of infantry in the United States Army, Mr. Battles has been associated with Battles & Co., investment brokers, Philadelphia and New York. For many years he has been a director and officer of Valve Pilot Corporation, and since July, 1948, has been executive vice-president of the corporation.

◆

GLOBE STEEL TUBES COMPANY.—*F. K. Krell* has been appointed manager of sales, welding fittings, of the Globe Steel Tubes Company, and *John F. Scott* has been appointed manager of sales, stainless and alloy tubing. *John Koss*, formerly in charge of export sales, has been appointed sales representative, Chicago district, and *J. J. Lukens*, formerly head of the pricing



Take this BIG BITE Out of Your PUNCHING and SHEARING COSTS!

Shear in Position for Fast Work

"Buffalo" SINGLE END PUNCH WITH SHEAR

- A powerful, fast machine designed for railway shops, heavy industries.
- Quick-change attachments to keep a wide variety of jobs MOVING!
- Punches accurately and to 3/8" of corners of webs or flanges.
- Full-floating punching head allows bringing punch down to exact spot on work to be punched.
- Hundreds have paid their way in a short time in LOWER fabrication costs!

WRITE FOR BULLETIN 303-D

1. SHEARING FLATS
2. CUTTING ANGLES
3. PUNCHING BEAMS AND CHANNELS
4. TRIPLE PUNCHING
5. CUTTING TEES

"Buffalo" MACHINE TOOLS

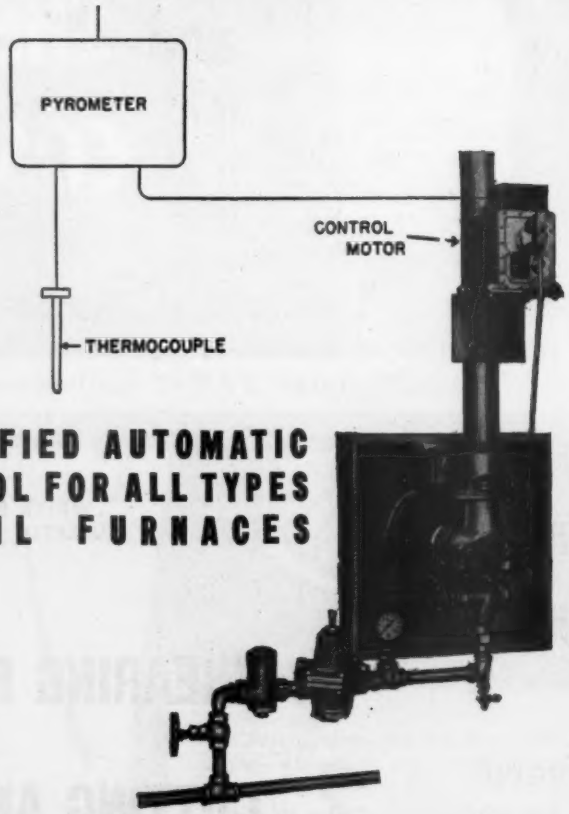
BUFFALO FORGE COMPANY

174 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING CUTTING BENDING

Specify JOHNSTON
PROPORTIONING
CONTROL SYSTEMS



SIMPLIFIED AUTOMATIC CONTROL FOR ALL TYPES OF OIL FURNACES

SAVES Time and Fuel Oil

Here's the answer to the widespread need for a simplified, dependable automatic control system *at moderate cost!* It employs the service-proved JOHNSTON "Reverse Blast" Oil Burner with JOHNSTON Fueltrol Proportioning Valve and control motor attached. Synchronizing mechanism is provided so that the air and oil balance is maintained in the same ratio at any setting between low and high fire.

Most types of pyrometers can be used. Schematic diagrams can be furnished on request showing complete control hook up.

Send us full details on your furnace to be controlled and we will submit information concerning equipment required.

Write for Bulletin R 508 and diagram 13172.

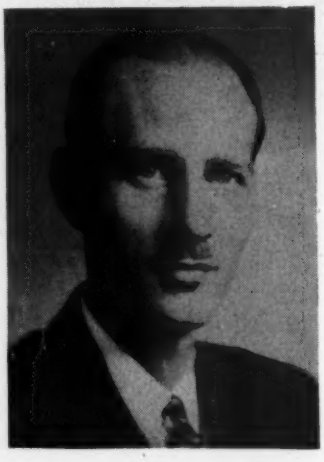
SAFETY THE JOHNSTON LINE DEPENDABILITY

JOHNSTON MANUFACTURING CO.
2825 EAST HENNEPIN AVE.
MINNEAPOLIS 13, MINN.

ENGINEERS & MANUFACTURERS OF INDUSTRIAL HEATING EQUIPMENT

division, has been appointed sales representative, New York district.

Mr. Krell joined the company's general sales staff in 1942 and was appointed



F. K. Krell

advertising manager two years later. In 1946 he became sales service supervisor and in 1947 was appointed Chicago district sales representative.

Mr. Scott joined Globe Steel Tubes in 1940 as a metallurgist and was later transferred to the general sales office as

John F. Scott

a chemical and metallurgical sales representative. Early in 1947 he was appointed sales representative for the New York district.

◆

WARNER & SWASEY CO.—The New England district office of Warner & Swasey, has been moved from the Kendall Square building, Cambridge, Mass., to 20 Chestnut st., Needham 92, Mass. The company's Buffalo office has been moved from the Iroquois building to the Vars building, 344 Delaware avenue. *John L. MacQuown* has been appointed a representative of Warner & Swasey in Hartford, Conn., supplementing the company's Cambridge, Mass., district sales office.

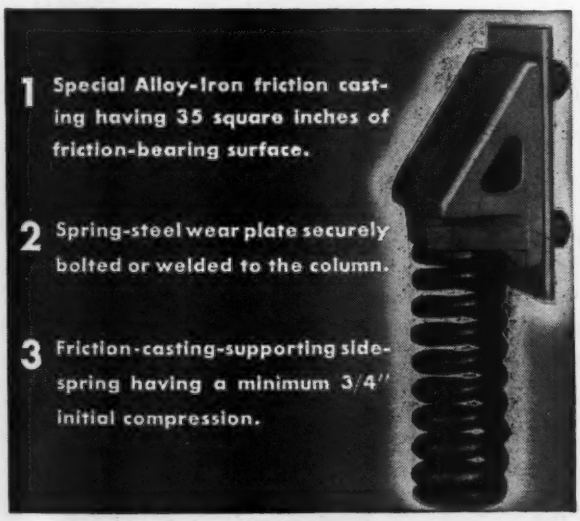
◆

FAIRBANKS, MORSE & CO.—T. M. Robie, manager of the Diesel division, Fairbanks, Morse & Co., at Chicago, has been appointed director of quality control at the company's Beloit, Wis., works. J. W. Wright, formerly manager of the

l o n g e r SPRINGS

BARBER STABILIZED TRUCKS

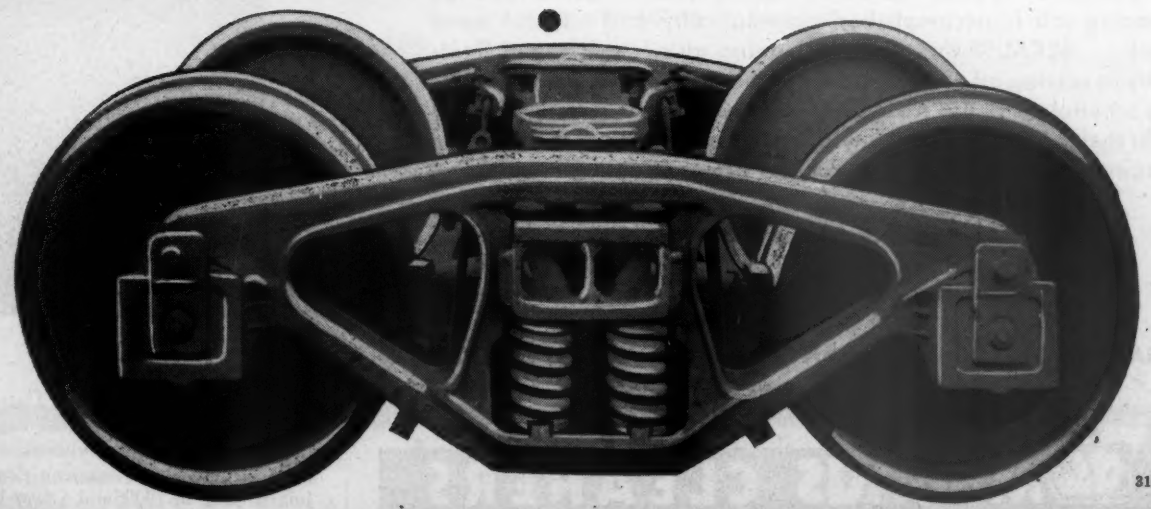
Over 210,000 sets of Barber Stabilized Trucks have been ordered.


1 Special Alloy-Iron friction casting having 35 square inches of friction-bearing surface.
2 Spring-steel wear plate securely bolted or welded to the column.
3 Friction-casting-supporting side-spring having a minimum 3/4" initial compression.

Back in 1939 it was apparent that the constant demand for higher train speeds would create a demand for l-o-n-g-e-r Bolster Springs to cushion and absorb the greater road shocks which would be encountered.

At that time, pioneering studies and tests on l-o-n-g-e-r springs were started by this Company, resulting in the development of Barber Trucks for springs having up to 3 13/16" travel or more, with the necessary stabilizing combination to control their greater movements.

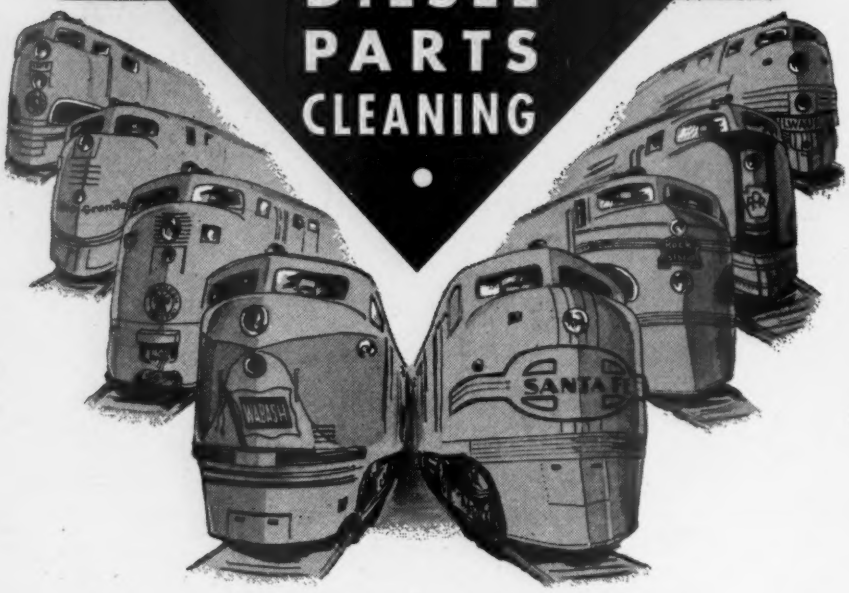
Many thousand Car Sets of these l-o-n-g-e-r Spring Barber Stabilized Trucks are now in service, giving Freight Cars a fully controlled, smoother Vertical and Lateral ride.



3174R

STANDARD CAR TRUCK COMPANY
332 SOUTH MICHIGAN AVENUE, CHICAGO, ILLINOIS

THEY'VE GOT THE HIGHBALL ON FAST, SURE, LOW COST DIESEL PARTS CLEANING



These roads and many others have found the dependable, economical and speedy way of cleaning diesel parts . . .

MAGNUS 755 in the MAGNUS AJA-DIP CLEANING MACHINE

They use Magnus Decarbonizing Compound #755 because it is the best-by-test chemical for removing stubborn carbonized oil deposits and grease . . . Because it cleans thoroughly with negligible hand work . . . BECAUSE it's safe for all metals . . . BECAUSE Magnus 755 *lasts*—and is still going strong, with months of cleaning service to go—when other cleaners of this type are exhausted.

They use Magnus Aja-Dip Cleaning Machines BECAUSE the cleaning job is accomplished automatically and without hand work . . . BECAUSE this speedy cleaning gives them broad flexibility in solving all parts cleaning problems and in meeting cleaning schedules . . . BECAUSE they can design their cleaning set-up to fit their needs, due to the wide range of capacities in which the Magnus Aja-Dip Cleaning Machines are available.

Magnus 755 and the Magnus Aja-Dip Cleaning Machine offer you the highball on diesel cleaning. Write for Bulletin 407-AST for the full story.

Railroad Division

MAGNUS CHEMICAL COMPANY • **77 South Ave., Garwood, N. J.**

In Canada—Magnus Chemicals, Ltd.
4040 Rue Masson, Montreal 36, Que.

Magnus CLEANERS AND CLEANING EQUIPMENT

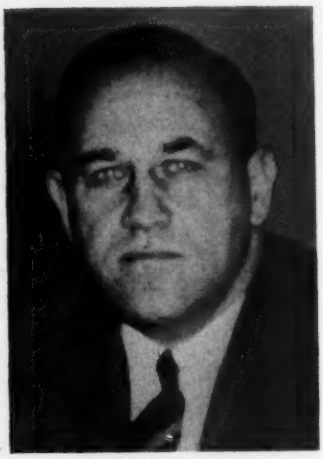
Representatives in all principal cities

Diesel engine sales department at Kansas City, Mo., succeeds Mr. Robie as manager of the Diesel division at Chicago.

◆

OAKITE PRODUCTS, INC.—*John A. Carter* has been elected president of Oakite Products, Inc., to succeed *D. C. Ball*, who has been elected chairman of the board. *David S. Ball*, formerly vice-president, was elected to the newly created position of first vice-president. *G. H. Brauburger* has been appointed technical service representative for Oakite with headquarters at 22 Thames street, New York 6.

Mr. Carter has been associated with



John A. Carter

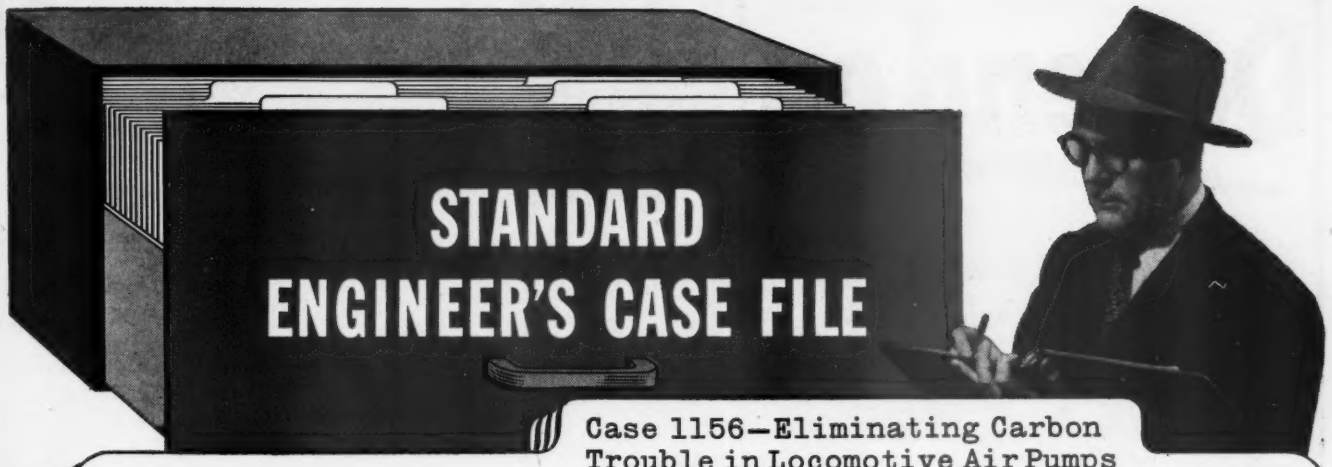
Oakite for 34 years, serving in recent years as assistant to the president and, since December, 1947, as general manager.

◆

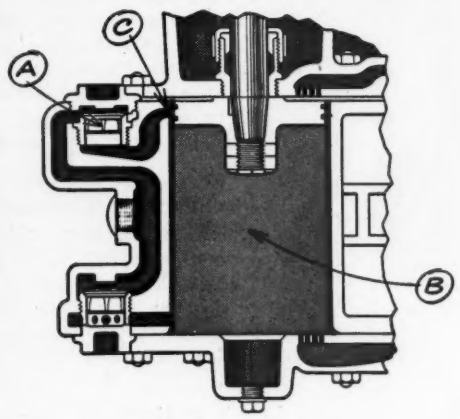
GENERAL ELECTRIC COMPANY.—*C. M. Davis*, manager of the transportation engineering division of the apparatus department of the General Electric Company, who has retired as announced in the July

C. M. Davis

issue, is a graduate of the University of Michigan with an electrical engineering degree and of Union College, Schenectady, N. Y., with a master's degree. He joined G. E. in 1909, and a year later was assigned to the consulting engineering department. In 1913, he entered what is now the transportation division and, in 1924, was sent to Australia to represent the company in connection with the electrification of the Sydney suburban lines



Case 1156—Eliminating Carbon Trouble in Locomotive Air Pumps



LOCOMOTIVE AIR PUMP
HIGH-PRESSURE CYLINDER AND DISCHARGE

After a full year of operation on an engine in main line service, the air discharge valves in the air pump, lubricated with Calol Air Pump Lubricant, were free of carbonaceous deposits ... pistons, rings and lands were also clean. Recommended for both the air and steam ends of Westinghouse and New York locomotive air compressors.

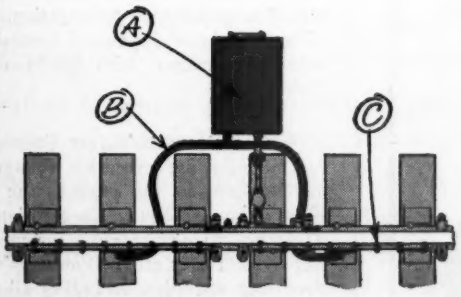
A. Contains special additive—resists oxidation and the formation of lacquer and carbon throughout the pump and especially in critical valves.

B. Prevents development of high temperatures . . . sticks on cylinder walls, pistons and other parts —minimizes oil carry over into air passages and valves.

C. Detergent keeps rings clean and free, air passages open.

Calol Air Pump Lubricant is made of selected stocks with very low carbon-forming tendencies.

Case 1141—Reducing Wear on Rails at Curves



AUTOMATIC RAIL AND FLANGE LUBRICATOR

Car and engine wheels carried Calol Rail and Flange Lubricant and lubricated rails for a distance of more than two miles from an automatic lubricator. Calol Rail and Flange Lubricant is made from a highly water-resistant base and special lubricating graphite.

A. Very stable in use and storage — will not separate in any climate along U.S. railroads . . . will not wash off rails or flanges.

B. Pumps freely from lubricator — suitable for use in temperatures from below zero F. to over 160 degrees above.

C. Forms and retains "button" formation on wiping bar.

Calol Rail and Flange Lubricant has a "short" non-stringy texture. This keeps it on flanges and the sides of rails and minimizes the usual tendency of grease to pull over the tops of rails.

For additional information and the name of your nearest Distributor, write

STANDARD OIL COMPANY OF CALIFORNIA
225 Bush Street, San Francisco 20, California

The California Oil Company
Barber, New Jersey

The California Company
17th and Stout Streets, Denver 1, Colo.

Standard Oil Company of Texas
El Paso, Texas

CALOL

Trademark Reg.
U.S. Pat. Office

Depend on

the battery that's
Designed for Diesel Duty—
AND DOES THE JOB IT'S DESIGNED TO DO!

Diesel driven equipment demands...

- A Battery that gives a large volume of current at starting motor voltage requirements . . .
- A Battery that maintains operating voltages at low temperature limits . . .
- A Battery that's built with high electrical efficiency and conducting capacity . . .
- A BATTERY THAT'S DESIGNED TO SATISFY THESE AND THE MANY OTHER AUXILIARY DEMANDS OF DIESEL SERVICE . . .

K. W.I. Depend on K. W. to do the job it's designed to do!

KW KW KW KW

K. W. BATTERY COMPANY. Inc.

3705 N. LINCOLN AVE. CHICAGO 13 — Foot of MONTAGUE ST. BROOKLYN, 2

of the New South Wales Government Railways. Mr. Davis was appointed engineer of the transportation department in 1934 and manager of the transportation engineering division in 1945.

◆

BALDWIN LOCOMOTIVE WORKS.—*George S. Grassmyer* has been appointed manager of inspection of the Eddystone division of the Baldwin Locomotive Works. Mr. Grassmyer formerly was a member of the field service and inspection department.

◆

AMERICAN BRAKE SHOE COMPANY.—*Roger W. Batchelder* has been appointed vice-president in charge of sales of the National bearing division of the American Brake Shoe Company, with headquarters at S. Louis, Mo.

Mr. Batchelder joined Brake Shoe in 1933. He was general purchasing agent from 1945 to 1948, and assistant to the president of the division at the time of his recent appointment. During World War II he served as a colonel with the United States Army Air Forces.

◆

SPRING PACKING CORPORATION.—The Spring Packing Corporation has moved its Chicago quarters to 332 South Michigan avenue. The announcement of this change in the July issue erroneously listed the firm as the Chicago Packing Corporation.

◆

LINK-BELT COMPANY.—The Cleveland, Ohio, office of the Link-Belt Company has been moved to 314 Hanna building, Cleveland 15; the Baltimore, Md., office to 2315 St. Paul street, Baltimore 18; and the Huntington, W. Va., office to 1009 Fifth avenue, Huntington 1.

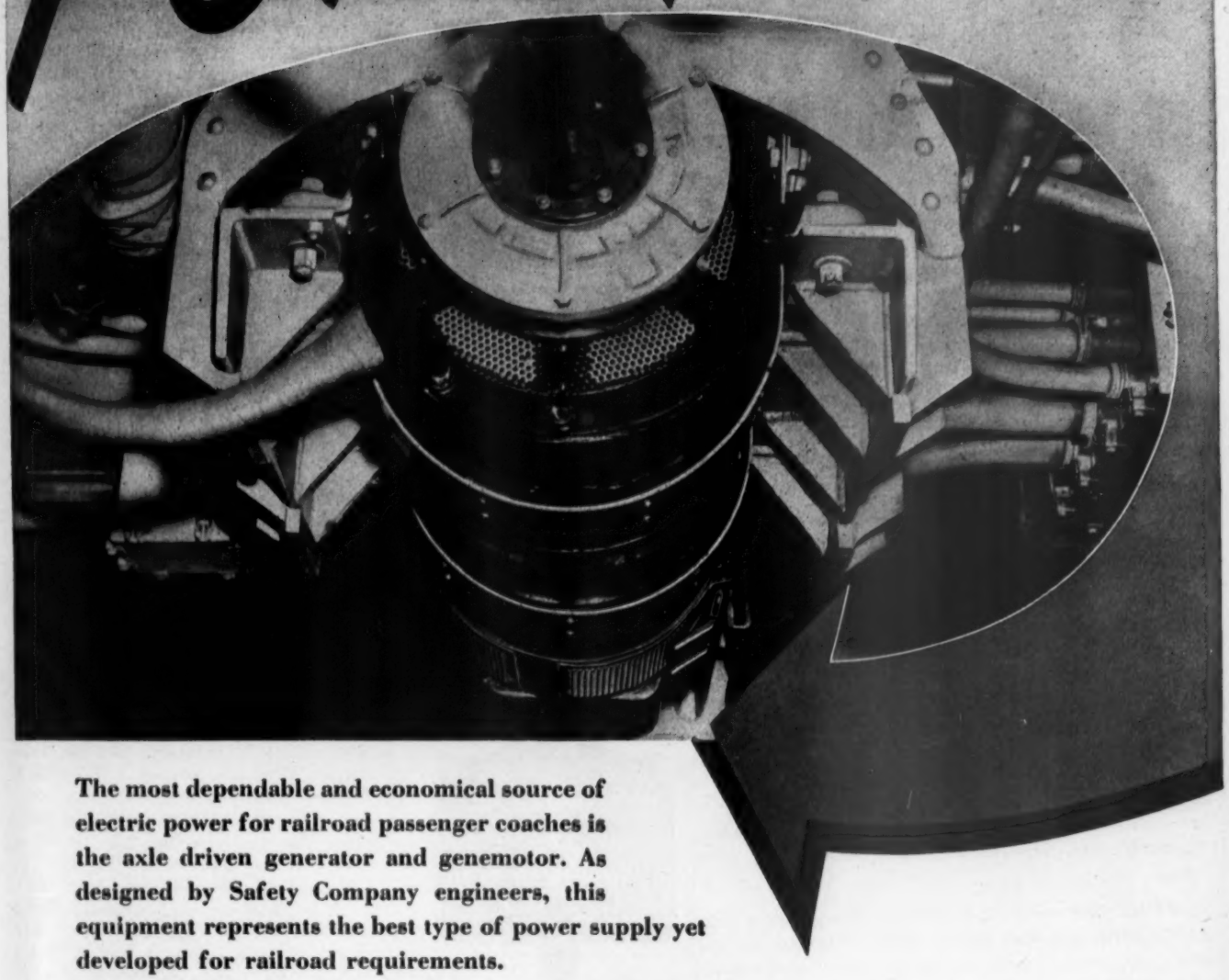
◆

MORTON GREGORY CORPORATION.—*R. C. Friedly*, assistant general sales manager of the Nelson stud welding division of the Morton Gregory Corporation, Lorain, Ohio, has been appointed central states regional manager, with headquarters at Chicago.

◆

WESTINGHOUSE ELECTRIC CORPORATION.—The following executive changes have taken place in the organization of the Westinghouse Electric Corporation: *L. E. Osborne*, vice-president, assigned staff supervision over all the company's manufacturing activities, including all matters of production and industrial relations; *James H. Jewell*, recently elected vice-president, appointed to take over staff supervision of all sales and marketing; *John K. Hodnette*, vice-president and head of the transformer division at Sharon, Pa., appointed general manager of industrial products, with headquarters at Pittsburgh, Pa.; *John M. McKibbin*, also a recently elected vice-president, appointed general manager of consumer products, with responsibility for operation and distribution of the appliance and the home radio divisions at Pittsburgh; *Tomlinson Fort*, formerly manager of central station sales activities, appointed manager, apparatus sales department; *William W. Sproul*, formerly transformer sales

POWER unequalled



The most dependable and economical source of electric power for railroad passenger coaches is the axle driven generator and genemotor. As designed by Safety Company engineers, this equipment represents the best type of power supply yet developed for railroad requirements.

Safety Company generators and genemotors reflect 35 years continuous research and development by engineers trained in the railroad industry. Equipment is made to assure maximum efficiency and economy in operation . . to simplify maintenance . . and to withstand the rigors of railroading.

Safety Company's modern manufacturing and inspection methods assure minimum maintenance and many years of trouble-free service.

Generators 1 KW to 20 KW **Genemotors 5 KW to 30 KW**

GUARANTEED PERFORMANCE
LIBERALLY DESIGNED
RUGGED CONSTRUCTION
RIGIDLY INSPECTED
EASY TO MAINTAIN
TIME-TESTED IN SERVICE

THE SAFETY CAR HEATING AND LIGHTING COMPANY INC.

NEW YORK · CHICAGO · PHILADELPHIA · ST. LOUIS · SAN FRANCISCO · NEW HAVEN · MONTREAL

● SAFETY COMPANY PRODUCTS INCLUDE: Complete Air-Conditioning Equipment ● Genemotors ● Generators ● Fans ● Regulators ● Lighting Fixtures ● Switchboards ● Parcel Racks ● Generator Drives ● Motor Alternators ●

"The lowest-cost gate valve we have ever used!"

. . . that's what they say about the

LUNKENHEIMER "King Clip" Gate Valve

THE first clip type valve was originally developed many years ago by Lunkenheimer and was one of the most popular gate valves ever designed. As service demands became more severe, the basic design was improved into the present "King Clip". Twenty-one different patterns are now available for a wide range of service conditions in virtually all industries.

The "King Clip" is truly the leader of all clip type valves . . . it offers you a money saving solution to many valve problems. Write for Circular No. 561.

There are good reasons why so many valve users prefer "King Clip" Valves. Note these features:

Exceptionally strong body and bonnet construction.
Extra length pipe threads for a strong, safe joint.
Sharply tapered disc seats tightly.
Large, unobstructed channels really drain the bonnet.
Coarse stuffing box threads provide greater resistance to corrosion and stripping . . . reduce annoyance of leaky stuffing boxes.
Easy to disassemble and reassemble.
Exceptionally low maintenance cost.
In bronze mounted patterns, rolled-in seat rings, integral non-corrodible stem thread bearing and special alloy stem assure longer life.

LUNKENHEIMER manufactures a wide variety of products for railroad service requirements . . . Valves of bronze, iron and steel; cocks, fittings, unions, air nozzles, boiler mountings and lubricating devices. Write for Circular No. 521, "LUNKENHEIMER VALVES for Railroad Service."

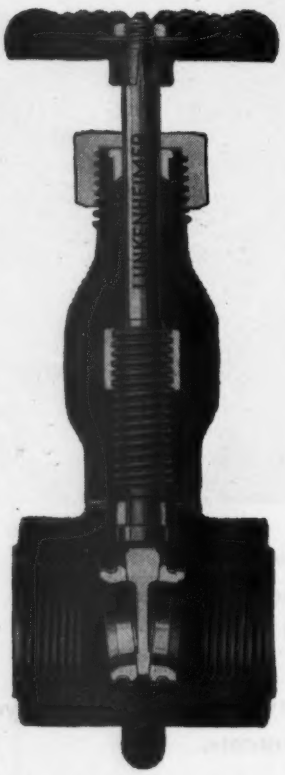
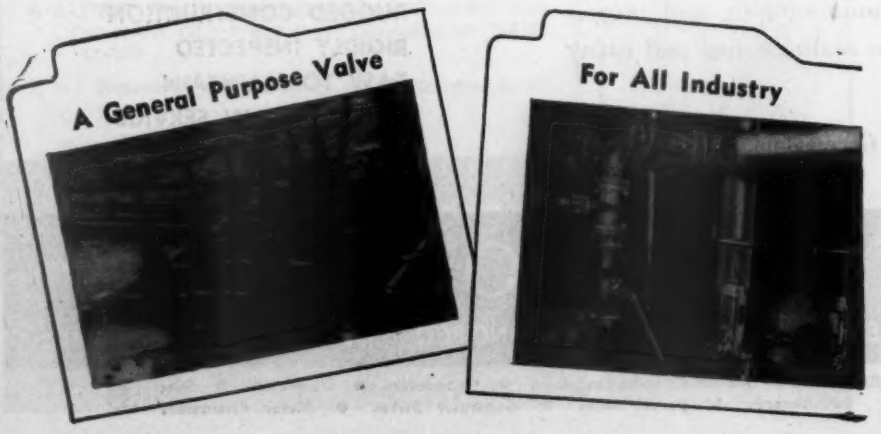


Fig. 1640 Iron Body Bronze Mounted . . . for steam, oil, gas, air, water and gasoline service.

Fig. 1644 All Iron . . . for handling solutions which attack bronze.

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI 14, OHIO, U. S. A.
NEW YORK 13 CHICAGO 6
BOSTON 10 PHILADELPHIA 34
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.



manager, appointed sales manager, industrial products; and *Royal C. Bergvall*, assistant to the vice-president since 1938, appointed engineering manager, industrial products.

◆

R. L. Brown has been appointed division engineer in charge of engineering and development of instrument transformers, tap changers, and large power centers for the Transformer Division of the Westinghouse Electric Corporation in Sharon, Pa. He succeeds *J. H. Chiles, Jr.*, who has become engineering manager for the entire Transformer Division.

◆

INDUSTRIAL BROWNHOIST CORPORATION.—*H. D. Wright* has been appointed director of sales, western region, for the Industrial Brownhoist Corporation, with headquarters in San Francisco, Calif.

◆

UNITED STATES RUBBER COMPANY.—*F. M. Urban* has been appointed sales manager of engineered rubber products, United States Rubber Company, Fort Wayne, Ind.

◆

ANSUL CHEMICAL COMPANY.—The Ansul Chemical Company of Marinette, Wis., has opened offices in Los Angeles, Calif., Fresno and Oakland, and will offer sales and service for the Ansul dry chemical fire extinguishers in the Pacific Coast states formerly served by the Snowden Chemical Company, Modesto, Calif.

Obituary

WILLIAM B. WAIT, president of the Valve Pilot Corporation, died on June 26. Mr. Wait was born on July 13, 1872, in New York, and educated in the public schools there. Upon graduation from the Columbia University Law School in 1894, he was admitted to the bar. He had been president of Valve Pilot since 1927. Mr. Wait was a navy veteran of the Spanish-American war and of World War I; a member of the New York Naval Militia from 1896 until 1922, and after the war was commander of its first battalion, with the rank of captain.

◆

HAROLD C. BULLARD, plant engineer of the Bullard Company, Bridgeport, Conn., died on June 28. Mr. Bullard was 69.

◆

J. FREDERIC BYERS, SR., chairman of the board of the A. M. Byers Company, died recently in Roosevelt Hospital, New York.

◆

H. B. ELLIS, formerly service manager of the Electro Motive Division, General Motors Corporation, died Friday, July 8, at his home near Miami, Fla.

◆

JAMES S. HEARONS, sales manager, railway division, of the Clark Equipment Company, with headquarters at Chicago, died on June 12, after a heart attack.

◆

GUILFORD S. WOOD, who founded and operated for many years a railroad supply firm bearing his name at Chicago, died in that city on June 14, at the age of 97.

Announcing—

COPPERIZED CZC-TREATED WOOD

for even longer life!

ACCELERATED SERVICE TESTS
(Untreated Control = 100)

PRESERVATIVE	SERVICE LIFE TO DATE*	ESTIMATED SERVICE LIFE	ACTUAL SERVICE LIFE
UNTREATED CONTROL	—	—	100
ZINC CHLORIDE	—	—	174
CZC	233	285	—
COPPERIZED CZC	279	519	—

*Based on 85.5 months' exposure. All figures merely express a relationship between treatments and untreated control.

THANKS TO an improved preservative formulation, Copperized Chromated Zinc Chloride, you can count on greater service life from salt-treated wood.

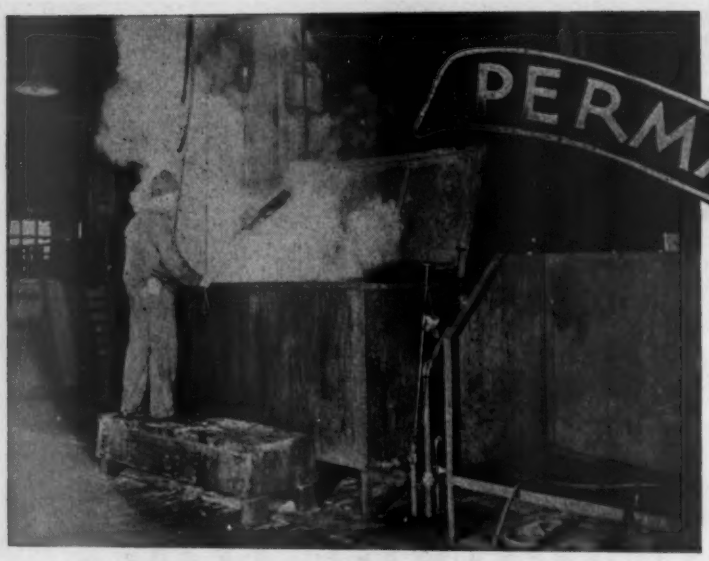
This new formulation . . . the product of cooperative research by chemists of E. I. du Pont de Nemours & Co., Inc., and Koppers Company, Inc. . . . provides longer service life than Chromated Zinc Chloride, the salt preservative from which it was developed. Accelerated service tests bear this out, as shown in the accompanying table.

While adding extra years of service, this new preservative retains all the outstanding advantages of CZC. It is decay resistant, termite repellent, clean, odorless and paintable. There is no loss of strength in wood treated with Copperized CZC.

You'll add years of service to car lumber, platforms, roof decking and other installations, by using wood pressure-treated with this new COPPERIZED CZC. It's a worthwhile investment . . . investigate it today.

KOPPERS COMPANY, INC.
Pittsburgh 19, Pa.

KOPPERS PRESSURE-TREATED WOOD



Cleaning Air Compressor in a prominent Railroad Shop

This photo shows PERMAG Cleaning Compounds in action in hot tank cleaning of engine parts. The penetrating power—speed—thoroughness of PERMAG Compounds assure a highly satisfactory job in railroad shops. PERMAG is used with equal efficiency for cleaning large steam or Diesel locomotives, and for general maintenance.

PERMAG CAR CLEANER is unexcelled for removing Diesel oil film, dirt and grease from stainless steel or painted coaches.

More details on PERMAG for railroad service sent on request.

Our Technical representatives are available for consultation on cleaning problems.

Write or 'phone.

MAGNUSON PRODUCTS CORPORATION

Mfrs. Specialized Cleaning Compounds for Industry

50 COURT STREET BROOKLYN 2, N. Y.

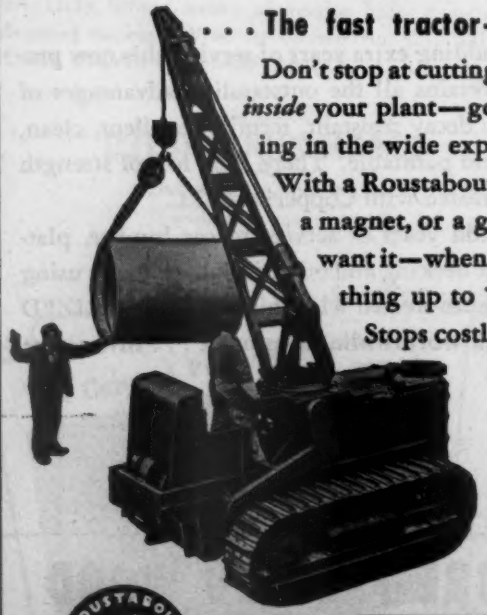
In CANADA: Canadian PERMAG Products Ltd., Montreal, Quebec

Reduce Costs Outdoors as Well as In with

ROUSTABOUT CRANES

. . . The fast tractor-footed load hustlers

Don't stop at cutting materials handling costs *inside* your plant—go outside and start slashing in the wide expanses that eat up profits. With a Roustabout crane you've got a hook, a magnet, or a grab-bucket anywhere you want it—when you want it. Handles anything up to 7½ tons, uphill or down. Stops costly, manpower-wasting delays. Modernly engineered for years of overwork . . . mounted on crawler or wheel tractors. Write for the whole efficiency story now—to Dept. G-4



HUGHES-KEENAN CORPORATION

DELAWARE, OHIO, U. S. A.

Load-Handling Specialists since 1904

PERSONAL MENTION

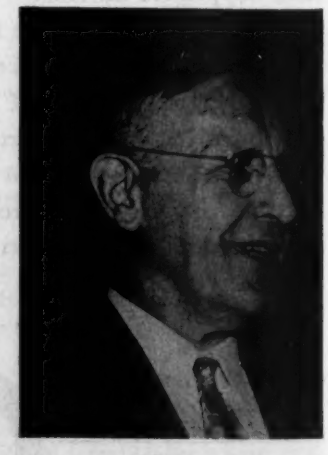
General

CLYDE B. HITCH, chief mechanical officer of the Chesapeake district of the Chesapeake & Ohio, with headquarters at Richmond, Va., retired on July 1 under the pension rules of the company, after 47 years of railroad service, 41 of which were with the C.&O.

A. V. NYSTROM, formerly assistant general superintendent, locomotive and car departments, Chicago, Milwaukee, St. Paul & Pacific, at Milwaukee, Wis., has been appointed assistant to the general superintendent of motive power of the Chicago, Rock Island & Pacific at Chicago, with jurisdiction over all mechanical matters.

ELMER A. KUHN, superintendent motive power of the Pere Marquette district of the Chesapeake & Ohio, succeeds to the duties of the former position of chief mechanical officer of the district which has been abolished, with full jurisdiction over the mechanical department. Mr. Kuhn retains the title of superintendent motive power and maintains headquarters as before at Grand Rapids, Mich.

EDWARD L. BACHMAN, general superintendent of motive power of the Pennsylvania at New York, who was granted a leave of absence on May 1, as reported in the June issue, will retire on August 31, after more than 47 years of service. Mr. Bachman was born at Coshocton, Ohio, on January 24, 1881, and was educated in the public schools there. He worked briefly for the East Ohio Gas Company and the Keagy & Lear Machine Co., during which period he completed a course in steam engineering with the International Correspondence School. Mr. Bachman entered railroad service in 1902 as a machinist at the Dennison, Ohio, shops of the Pennsylvania and later worked at various points on the system as enginehouse foreman, master mechanic and in



Edward L. Bachman

STOP DANGEROUS AND COSTLY BOXCAR FLOOR BREAK-THROUGH WITH NAILABLE STEEL FLOORING

In Detroit Testing Laboratory test to determine cantilever strength, 11,000 lbs. of pig iron were loaded on a panel consisting of three NAILABLE STEEL FLOORING boxcar channels welded side by side. The cantilever span was 30". Under this floor load of 733 pounds per square foot—far in excess of heaviest freight loading—the NAILABLE STEEL FLOORING section *hadn't even reached the yield point.*

In actual use as well as in laboratory tests it has been proved that NAILABLE STEEL FLOORING can't break through under *any* kind of heavy freight. Boxcars with NAILABLE STEEL FLOORING have safely hauled heavy copper cakes, automobile engines, highly concentrated loads of sheet steel and tinplate as well as hundreds of other commodities.

No Fork Truck Break-Throughs Either

NAILABLE STEEL FLOORING supports the biggest fork trucks, too, which so often break through conventional floors. For example, 23 cars are spotted each day at the Wabash Railroad's Ford Loading Dock in Detroit. Although they're all new or recently rebuilt, an average of *five* or *six* cars per day come in with large holes somewhere throughout the length of the floor where fork trucks have broken through.

Durability Means Low Maintenance . . . Low Operating Costs

NAILABLE STEEL FLOORING stops the break-throughs—and a good many other common floor troubles. It isn't chewed up by pinch bars or rough freight. Although nails are tightly clinched, they don't tear, splinter or deform the floor. All this adds up to lower maintenance costs—and lower operating costs as well. When floors stay in good condition for all types of freight, cars require less switching and empty movement.

To eliminate dangerous break-throughs and reduce maintenance costs, specify NAILABLE STEEL FLOORING for the next boxcars you build or rebuild.

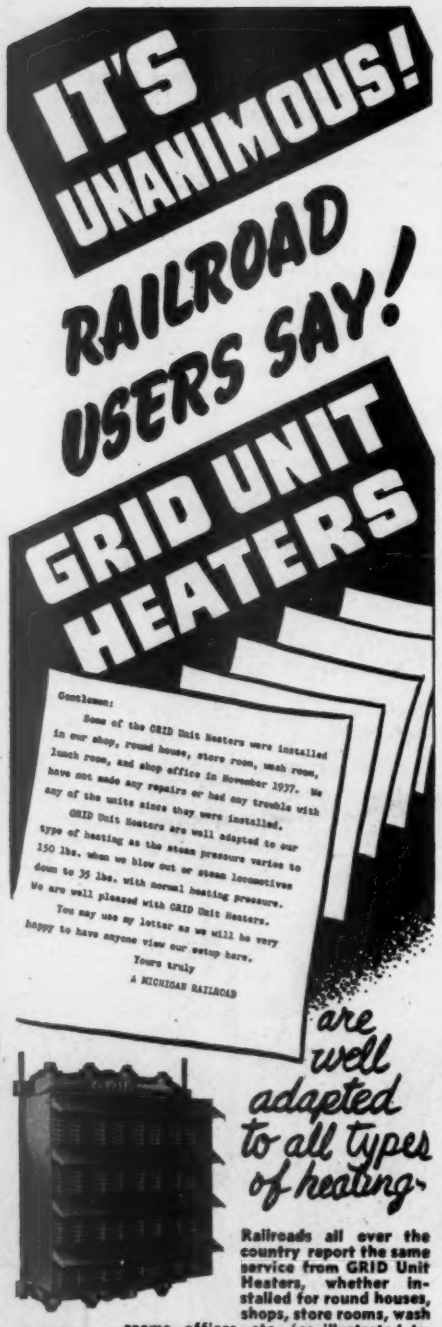
"Many delays and potential accidents have occurred and are continuing to occur, due to pig iron, lead, copper bars and similar commodities breaking through boxcar floors . . . this condition . . . is due to the type of equipment selected for this type of loading." (Car Department Officers Association Report by Committee on Preparation of Freight Cars, September 20, 1948)

NAILABLE STEEL FLOORING
A GREAT LAKES STEEL PRODUCT

GREAT LAKES STEEL CORPORATION

Steel Floor Division • 3576 Penobscot Building • Detroit 26, Michigan

UNIT OF NATIONAL STEEL CORPORATION


IT'S UNANIMOUS!
RAILROAD USERS SAY!
GRID UNIT HEATERS
Gentlemen:
Some of the GRID Unit Heaters were installed in our shop, round house, store room, wash room, lunch room, and shop office in November 1937. We have not made any repairs or had any trouble with any of the units since they were installed.
GRID Unit Heaters are well adapted to our type of heating as the steam pressure varies to 150 lbs. when we blow out or steam locomotives down to 35 lbs. with normal heating pressure.
We are well pleased with GRID Unit Heaters.
You may use my letter as we will be very happy to have anyone view our setup here.
Yours truly
A MICHIGAN RAILROAD
are well adapted to all types of heating.

Railroads all over the country report the same service from GRID Unit Heaters, whether installed for round houses, shops, store rooms, wash rooms, offices, etc. (as illustrated by above reproductions of letters received from railroads who have installed and used GRID Unit Heaters . . . many of them for as long as fourteen heating seasons). These reports are possible because:

HIGH TEST CAST IRON HEATING SECTIONS

GRID Unit Heaters are designed and made to eliminate maintenance . . . GRID heating sections are ONE piece construction high test cast iron—the metal for permanency. In GRID condenser "fin" sections there are no soldered, brazed, welded or expanded connections to become loose or develop leaks, breakdowns . . . no electrolysis to cause corrosion, breakdowns, leaks or heating failures, because there are no dissimilar metals used in GRID construction . . . GRID IS MAINTENANCE-FREE.

SAVES FUEL COST TOO!

GRID Unit Heaters are designed to save fuel cost, because they provide heat where it is most needed —to the working zone. They eliminate stratification of warm air at ceiling level . . . GRID Unit Heaters are designed for low outlet temperatures and greater air delivery to the floor line—not the ceiling.

Investigate the GRID system of diesel house heating. It's new and proved for this different service!

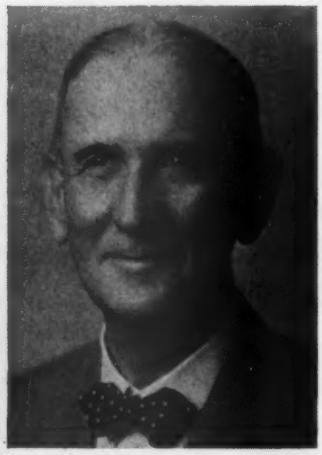
Write today for the complete GRID story—CUH-849-RM, capacity tables and engineering data.

D. J. MURRAY MANUFACTURING CO.
WAUSAU · WISCONSIN

other supervisory positions. He became general superintendent motive power of the New York Zone on December 1, 1936, and was in charge of the repair, maintenance and servicing of all locomotives and other rolling stock for both the Long Island and the New York division of the Pennsylvania until May 1.

RICHARD J. WILLIAMS, chief mechanical officer of the Pere Marquette district of the Chesapeake & Ohio, with headquarters at Detroit, Mich., retired on July 1 under the pension rules, after 50 years of railroad service.

L. E. DIX, mechanical superintendent of the Texas & Pacific, at Dallas, Tex., retired on August 1, after 51 years of railroad service. Mr. Dix, a native of Holton,



L. E. Dix

Kan., began his railroad career as a machinist apprentice with the Chicago, Rock Island & Pacific at Horton, Kan. He later served as machinist with the Atchison, Topeka & Santa Fe and the Missouri Pacific, and as master mechanic of the Union (a subsidiary of the M. P.) at Memphis, Tenn. In 1916 he was appointed master mechanic of the Texas & Pacific-M. P. Terminal (a joint subsidiary of the T. & P. and M. P.) at New Orleans, La.; in 1920 master mechanic of the T. & P. at Fort Worth, Tex.; in 1922 fuel supervisor, and in October, 1946, mechanical superintendent. Mr. Dix for many years was active in the affairs of the Railway Fuel and Traveling Engineers' Association, of which he was president from 1941 to 1946, inclusive.

Car Department

ERNEST BUCHHOLTZ, district general car foreman of the Northern district of Chicago, Milwaukee, St. Poul & Pacific at Minneapolis, Minn., has been appointed district general car foreman of the Southern district of the Milwaukee, with headquarters in Chicago.

JACOB HANSEN, general car foreman of the Chicago, Milwaukee, St. Paul & Pacific at Minneapolis, Minn., has been appointed district general car foreman of the Northern district, with headquarters at Minneapolis.

Master Mechanics And Road Foremen

ROSS ETHERINGTON, master mechanic of the Toronto, Hamilton & Buffalo at Hamilton, Ont., has retired under the company's pension regulations.

W. E. KNECHT, traveling engineer of the Litchfield & Madison, has been appointed master mechanic in charge of locomotive and car departments, system.

R. L. PONTON, general foreman of the Atlantic Coast Line at Jacksonville, Fla., has been appointed master mechanic at Rocky Mount, N. C.

J. G. CARLTON, master mechanic of the Seaboard Air Line at Hamlet, N. C., has been transferred to the North Florida division, with headquarters at Jacksonville, Fla.

HENRY BALLENBERGER, master mechanic of the Virginia division of the Seaboard Air Line, has left the road after 48 years of service.

W. J. JARRETT, master mechanic of the North Florida division of the Seaboard Air Line at Jacksonville, Fla., has been transferred to the position of master mechanic at Raleigh, N. C.

C. G. MAHONEY, general foreman of the Elgin, Joliet & Eastern at Gary, Ind., has been appointed master mechanic at Gary.

Electrical

HARVEY C. GRIFFITH, whose appointment as chief electrical engineer of the Pennsylvania, at Philadelphia, Pa., was

Harvey C. Griffith

reported in the June issue, was born at New Enterprise, Pa., on June 17, 1890. He received his electrical engineering degree from Lehigh University in 1914 and entered railroad service in February, 1915, as a draftsman with the Pennsylvania. He was appointed inspector in November, 1917; foreman in November, 1919; assistant engineer in May, 1927; assistant electrical engineer in May, 1929; electrical engineer in July, 1935, and assistant chief engineer, traction—communications—signals in January, 1945.